JUNE, 1949 Vol. 38, No. 6

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Black & Decker QUALITY in the SANDER

Means Better Training in Your Shop!

1. *Full-power B&D-built universal motor.*
2. *A perfectly balanced tool, easy for operator to control for light or heavy work.*
3. *Heat-treated, spiral beveled gears, match-lapped for smoothness, spline-mounted for strength.*
4. *Commutator, bearings and switch sealed against abrasive dust or dirt from the work.*
5. *All ball-bearings on steel inserts and grease-sealed for longer life. Needle roller bearing at back end of spindle.*
6. *Patented spindle lock for speed and ease in changing accessories.*

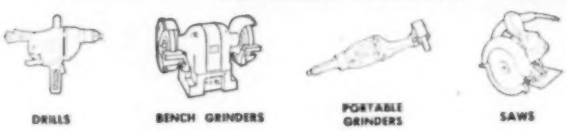
Give your students thorough, modern training in surfacing work. Buy the tools that are used by the thousands throughout industry . . . Black & Decker Portable Electric Sanders! These speedy, powerful tools will help you operate 100-and-1 projects . . . for fast, rough sanding; satin-smooth finishing; grinding down welds; removing rust. And their fine engineering, longer-wearing parts and husky construction give you the most for your money!

Versatile B&D Sanders drive abrasive discs, "Whirlwind" Wire Cup Brushes, saucer grinding wheels and rotary gouging and planing heads. You have your choice of three models: 7" Standard ($67); 7" Heavy-Duty ($76); 9" Heavy-Duty ($92). Ask your nearby Black & Decker Distributor for a free demonstration. Write for detailed catalog of over 100 Electric Tools to: The Black & Decker Mfg. Co., 680 Pennsylvania Ave., Towson 4, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

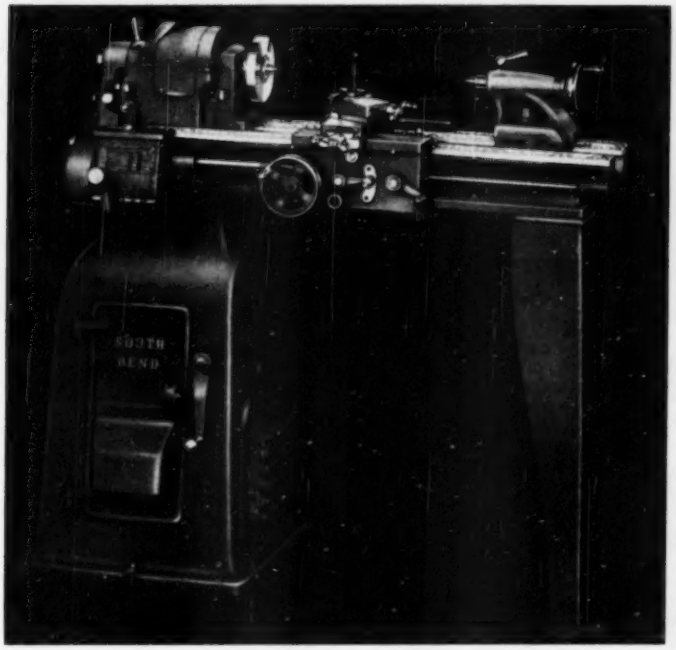
PORTABLE ELECTRIC TOOLS

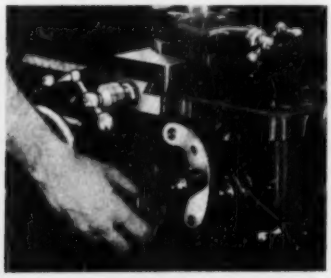


DRILLS | BENCH GRINDERS | PORTABLE GRINDERS | SAWS

Easier to Operate

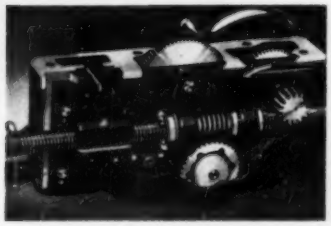
SOUTH BEND LATHES





Simple, Positive-Action Controls for Easy Machine Handling

South Bend Apron Controls are conveniently positioned for fast, easy operation. Each control has a distinctive shape that is instantly recognizable by touch. The cross-feed screw and compound rest screw are equipped with micrometer collars having clear cut, easy reading graduations. Power feeds are engaged through a friction clutch that will not slip under load. An automatic interlocking safety device prevents simultaneous engagement of opposing feeds.



Rugged Double-Wall Apron for Trouble-Free Service

This is an interior view of the apron used on all 10" and larger South Bend Lathes. There's nothing complicated about it... and it will give dependable service with a minimum of maintenance. The heavy, one-piece, double-wall construction provides rigid support for both ends of gear shafts.

A large oil reservoir provides ample lubrication, with only occasional attention. Half-nuts are close-coupled, and are dovetailed into the back wall of the apron.

In commercial shops where several makes of lathes are available, there is a noticeable preference shown for South Bend Lathes. Experienced mechanics are partial to them largely because they are easier to operate, although their precision, versatility, and efficiency are also greatly appreciated. And ease of operation is even more important in the school shop, because it contributes so much to the confidence of the beginner.

If you are planning a new shop installation or need additional equipment, write for a copy of our complete catalog and the name of our distributor located nearest you. He will gladly assist you without obligation.

Lathe Illustrated Above — 10" x 3-1/2' Quick Change Gear Lathe with 3 ph., 60 cy., 220 V., 3/4 h.p. motor and drum switch—f.o.b. factory— **$825.35**

SOUTH BEND LATHE WORKS

BUILDING BETTER TOOLS SINCE 1906 • 466 E. MADISON ST., SOUTH BEND 22, IND.

FINE TRAINING...
rates Snap-on Tools
Your students are the skilled mechanics of the future . . . the logical reason why you should acquaint them during their training period with fine Snap-on Tools — the choice of better mechanics everywhere. Using modern Snap-on Tools means early development of superior workmanship, speed, dexterity. These are attributes that reflect credit to you in growth of students to capable mechanics.
SNAP-ON TOOLS CORPORATION
8074-F 28TH AVENUE KENOSHA, WISCONSIN
Snap-on Tools
THE CHOICE OF BETTER MECHANICS

ARMSTRONG

New TOOL HOLDERS MAKE MORE PROFIT ON EVERY OPERATION

With ARMSTRONG TOOL HOLDERS you can take advantage of the new high speeds and heavier feeds of the newer cutting materials, without revolutionary changes or costly experimentation. They are the most profitable tools obtainable; the lowest in initial cost, the longest in service and most economical in use, for all incorporate the basic ARMSTRONG Principle of small interchangeable cutter-bits in permanent drop forged shanks. They are the most readily obtainable tools, too, for they are stocked by all leading distributors.

WRITE FOR CIRCULARS DESCRIBING

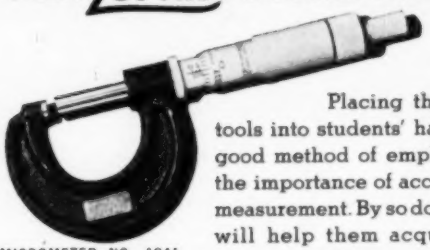
(1) ARMSTRONG Carbide TOOL HOLDERS and ARMIDE (Carbide Tipped) Cutters.

(2) ARMSTRONG C A TOOL HOLDERS and ARMALOY (Cast Alloy) Cutter-bits.

Write for NEW S-45 Catalog just released.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
5222 W. ARMSTRONG AVE. CHICAGO, 30 U.S.A.
New York • San Francisco

Stress the importance of
TRUTH IN DIMENSIONS
with LUFKIN Precision Tools



MICROMETER NO. 1941
Heavy, enameled, ribbed frame micrometer especially designed for students' use. Rust resistant "CHROME CLAD" non-glare satin finish on hub and spindle makes markings stand out in bright or poor light.

Placing these fine tools into students' hands is a good method of emphasizing the importance of accuracy of measurement. By so doing, you will help them acquire the same confidence which the name "Lufkin" has inspired in the minds of skilled craftsmen for more than sixty-five years. Write for free catalog.

★ SEND FOR THIS BOOKLET!
Send for this interesting and educational 5-color picture story book. Enclose 10c to cover handling and mailing costs. Write Dept. AE.

THE LUFKIN RULE COMPANY
PRECISION TOOLS · TAPES · RULES
Saginaw, Michigan

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, June, 1949, Volume 38, No. 6. Published monthly, except July and August, by The Bruce Publishing Co., 540 N. Milwaukee St., Milwaukee 1, Wis. Entered as Second-Class Matter January 2, 1914, at the Post Office at Milwaukee 1, Wis., under the act of March 3, 1879. Subscription price in the U. S., Canada, and countries of the Pan-American Union, $3.00 per year; Foreign, $3.50; Single copies, 35 cents.

Good News for School Shop Budgets

AMMCO model 2600 and 1600 Combination for Wet Honing

Costs less to BUY...and Costs less to MAINTAIN

$298.50

ONE *Permanent type* HONING HEAD handles 90% of all jobs within range!

Here's a really versatile combination set-up to meet all needs for shop training in both *wet* and *dry* honing. Best of all, it's the only honing machine that can handle all sizes within its range with *only one honing head* . . . And you'll find your stone replacement cost at least 50% less. Model 1600 Coolant Unit is portable and can be used with other machines in your shop. Mail the coupon below to get full information on the economical AMMCO honing combination. We'll also send you the name of your nearest AMMCO distributor who will be glad to arrange a demonstration in your shop at no charge or obligation.

Perfect for School Shops... the AMMCO 7" SHAPER

A "precision machine of a thousand uses" . . . regular industrial model, featuring simplicity of operation, ease of set-up, precision results. Check coupon for complete details.

AMMCO

AMMCO TOOLS, INC., 2100 Commonwealth Avenue, North Chicago, Ill.

- ☐ Send information on Combination 2600-1600
- ☐ Send information on AMMCO 7" Shaper
- ☐ Send free copy of the AMMCO Tool Catalog

NAME_____

POSITION_____ SCHOOL_____

CITY_____ ZONE____ STATE_____

Speed and Certainty with "SUPERSOCKETS"

● There's a "Supersocket" combination for every wrench need. The engineered flexibility of Williams "Supersockets" permits the combining of sockets, handles and accessories to create special wrenches for special jobs.

"Supersocket" speed and surety will save time for the vocational instructor . . . reduce job-hazards . . . present a real object lesson on the value of *good* tools to the neophyte mechanic. "Supersockets" are available in five different patterns, with drives ranging from 1/4" to 1" square and with socket openings from 3/16" to 3-1/8".

Write Dept. I-649 for Catalog A-50 describing Williams "Superrenches" and "Supersockets".

J. H. WILLIAMS & CO.
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BUFFALO 7, NEW YORK

WILLIAMS 1865

For SCIENCE INSTRUCTORS

A New Guide To Instrument Selection

This new catalog groups conveniently for your use instruments according to type and degree of precision. Included are fundamental measuring instruments, specialized electronic test equipment, sensitive relays and photoelectric devices. Complete specifications are given for all products. Free copies of this catalog are available to you. When requesting catalog please give name of school and your position. Weston Electrical Instrument Corporation, 595 Frelinghuysen Avenue, Newark 5, N. J.

WESTON *Instruments*

compare the SPECIFICATIONS of these 11" Logan LATHES then compare the PRICE*

Quick Change Gear Floor Model Lathe, 11" Swing, 1" Collet Capacity, 1⅜" Spindle Hole, 24" and 36" between centers.
$525.00 and $565.00

Quick Change Gear Cabinet Model, 11" Swing, 1" Collet Capacity, 1⅜" Spindle Hole, 24" and 36" between centers.
$725.00 and $782.50

By the size and variety of work they handle; by the speed, accuracy and economy with which they perform it, the new 11" swing Logan Lathes equip the school shop for a wide range of interesting projects. Efficient production methods, modern equipment and skilled personnel make it possible to price these rugged, accurate lathes substantially lower than any other lathes of comparable quality and specifications.

Available in bench, floor cabinet and turret models

WRITE FOR DETAILED INFORMATION ON ALL LOGAN 9", 10" AND 11" LATHES AND 8" SHAPERS

LOGAN ENGINEERING CO.
4901 WEST LAWRENCE AVENUE • CHICAGO 30, ILL.

They have CAPACITY

1" draw-in collet capacity, 1⅜" spindle hole, 24" and 36" center distances are indicative of the capacity Logan 11" lathes bring to any shop.

They are ACCURATE

Ball bearing spindle mounting assures sustained accuracy at any speed from 45 to 1500 rpm without bearing adjustment. Two V-ways and two flat ways of the rugged beds are precision ground to a tolerance of .0005" along the lineal capacity of the lathe. Total spindle run-out is held to within .0005" twelve inches from the bearings.

They are SAFE

To protect inexperienced student operators, the countershaft, back gears, headstock, change gears and motor drive belts of these 11" lathes are all completely enclosed, yet easily accessible.

They are DURABLE

Rugged overall construction withstands years of hard usage with a minimum of maintenance and a maximum of accuracy. Self-lubricating bronze bearings protect against wear at 35 points where bearings are not ordinarily used.

They CUT COSTS

Low price is the first of many economies. Low operating cost, low maintenance, quick easy set-up, versatility, and lasting accuracy all contribute to the reduced costs these 11" lathes make possible.

*SCREW CUTTING LATHES $485.00 to $782.50
TURRET LATHES $735.00 to $965.00
Prices F. O. B. Factory

LOOK TO Logan FOR BETTER LATHES AND SHAPERS

8

10 MOTORS IN ONE

to help you teach induction-motor design and connection

Leads from the 36 stator coils, brought out to 72 terminals, make possible 10 types of coil connections. The terminal board also shows the number and spacing of rotor bars.

Four G-E 72-terminal motors are used in the laboratory at the University of Colorado.

WITH the General Electric 72-terminal motor, your students can actually wire an induction motor for 10 different combinations of phase, voltage, and number of poles. This special educational motor is designed to help you teach winding design and coil connection.

Constructed for use as a motor as well as for winding instruction, the unit is rated at two hp, 1800 rpm when connected for 220-volt, 60-cycle, three-phase operation. **Net educational price, complete and assembled, with color-coded interconnecting leads, is $207.** For more information, write Apparatus Department, General Electric Co., Schenectady 5, N. Y.

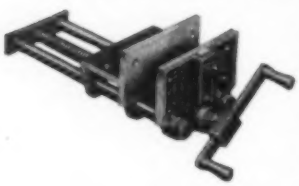
GENERAL ELECTRIC

New Columbian 804 Steel Welded Workshop Vise

With Handy Removable Pipe Jaws

The Columbian 804 Work Shop Vise is a rugged all-purpose vise of steel construction — fabricated by arc welding. Front and back jaws are welded from heavy steel. Screw and handle are cold rolled steel. Each Columbian 804 is finished in red enamel and packed in individual cartons.

Columbian Workshop Vise



★ Columbian Continuous Screw Woodworker's Vises are furnished with hard wood handles — or may be equipped with ADJUSTABLE STEEL HANDLES as above, to eliminate handle breakage, speed operation and provide extra leverage.

THE COLUMBIAN VISE & MFG. CO.
9022 Bessemer Avenue • Cleveland 4, Ohio
THE WORLD'S LARGEST MAKERS OF VISES

Specify * WALLACE

on your new school-shop equipment

"made-to-order" . . . for your shop!

. . . ONLY SHARP TOOLS CAN DO GOOD WORK . . .

WALLACE NO. 23
OILSTONE GRINDER

preferred in hundreds of school-shops

Especially designed for school-shop work — will not burn tools. Grinds a keen edge, accurately. Eliminates danger of flying emery and exploding wheels. Fine and coarse wheels, plus cone wheel for lathe tools. Wallace precision-built throughout!

- BANISHES GRINDING TROUBLES FOREVER
- KEEPS TOOLS & KNIVES ALWAYS SHARP
- HELPS STUDENTS DO MUCH BETTER WORK

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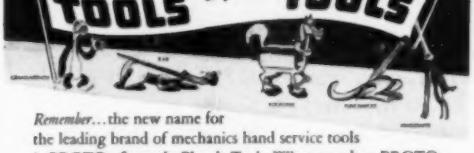
PIONEER MANUFACTURERS OF PORTABLE WOODWORKING MACHINES

NEW! a different name for your old friends!

PROTO TOOLS – formerly PLOMB TOOLS



Remember... the new name for the leading brand of mechanics hand service tools is PROTO—formerly Plomb Tools. When you buy PROTO from your dealer, you are getting tools designed and built for professional users. They have the same high quality, long life and superior designs that have made them the choice of professionals for over 40 years under the old brand name.

Write for catalog to

PLOMB TOOL COMPANY

2204 J Santa Fe Avenue, Los Angeles 54, California

PROTO Professional Quality TOOLS

LOS ANGELES

MADE IN U.S.A.

new sander

PORTABLE ELECTRIC

STERLING century SANDER

Now! Low cost, fast, *safe*, easy sanding with the new Sterling Century. Sand wood, metal, slate, composition—desks, blackboards, lockers—all types of school maintenance work. Send for folder!

Vocational Instructors!

Acquaint your students with production and maintenance sanding. It's faster, easier, better!

STERLING STP

STERLING TOOL PRODUCTS CO.

1336-P Milwaukee Avenue, Chicago 22, Illinois

Canada: Terminal Warehouse, Dept. 35, Toronto 1.

Send folder on New Sterling Century Sander

FIRM NAME

ATTENTION

STREET CITY STATE

SKIL Bench Grinder 447

The big, full-duty grinder with the "little grinder" price

More Features . . .

More Quality . . .

More Work Capacity

ONLY $39.50

BIG, POWERFUL MOTOR
Quiet, vibration-free . . . ideal for sustained classroom or maintenance shop duty.

FULL-SIZE 15" SPINDLE
A really full-size grinder—long 15" spindle.

EXTENDED END BELLS
Extra clearance around wheels for easier use even with wire brushes or cloth buffs.

ADJUSTABLE, MACHINED TOOL RESTS
Set-ups are simpler and faster with these easy-to-adjust tool rests.

OVERSIZE, SEALED BALL BEARINGS
Extra big, ball bearings sealed against dust and dirt for smoother operation—longer life.

HEAVY CAST BASE
Big, solid working base. Won't rock or "walk"—even when not bolted to bench.

REMOVABLE, CAST WHEEL GUARDS
Removable feature increases grinder uses. Guards are extra wide for use with wire brush wheels.

Here's the full-size grinder that gives you all the features you want at a budget-fitting price. Does double duty as an instructional aid and in school maintenance. Sharpens, grinds, buffs or polishes. Extended end bells and wheel guard design provide extra work clearance. Ask your SKIL Tools Distributor for a demonstration of SKIL Bench Grinder, Model 447, today!

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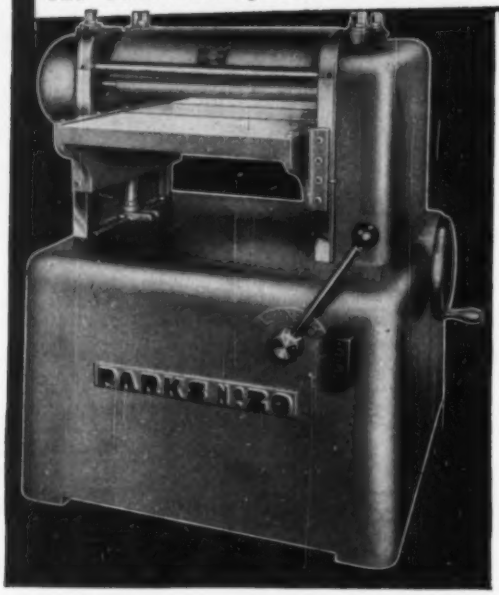
5033 Elston Ave., Chicago 30, Ill.
Factory Branches in Principal Cities
In Canada: SKILTOOLS, LTD.,
66 Portland St., Toronto, Ont.
SKIL TOOLS ARE MADE ONLY BY SKILSAW, INC.

SKIL Tools

The Sensationally NEW Low-Priced



PARKS No. 20
20" PLANER

Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds — 20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.

The PARKS Heavy-Duty 12" x 4" Planer

A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive catalog sheet.

The PARKS WOODWORKING MACHINE CO., Dept. 22-CC, 1546 Knowlton St., Cincinnati 23, O.

THE NEW *Hotpack*
ELECTRIC PLASTIHEETER

DESIGNED for use in plastic courses in the school, the Hotpack PLASTIHEETER is a commercial type strip heater made to heat sheets of Plexiglas or Lucite until they become soft and pliable for shaping to the form desired. It is essentially used for straight line bends or folds and is capable of heating sheet material up to ½" thickness in from 30 seconds to 2 minutes, depending on the thickness of the material. As the material does not come into contact with the heating element and the platen remains cool, there is no possibility of creating mark-off on the sheet.

Working Space: 18" long and 5" wide platen. Overall Size: 21" long x 7 " wide x 3½" high. Heating Unit: 20" long. Off-On Switch. Electrical Characteristic: 115 Volt — AC or DC — 200 Watts. Approximate Shipping Weight: 4 lbs.

Write for Catalog sheets with complete details

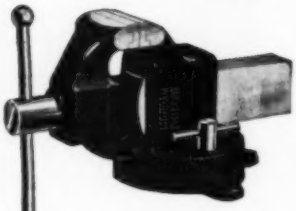
The ELECTRIC HOTPACK CO., Inc.
5067 Cottman Street • Philadelphia 35, Pa.

An UNBEATABLE VISE COMBINATION

A new low cost woodworking vise — ideal for school-shop use. Made of best materials, light in weight, yet sturdy in construction.

MACHINIST VISE

Unsurpassed for Strength and durability. Supplied with stationary or swivel base and in various sizes.



CONTINUOUS SCREW AND QUICK ACTION VISE

Designed and built to withstand the most severe service. The extra heavy Cold Rolled Screw and Solid Nut will last a lifetime.

MORGAN VISE COMPANY
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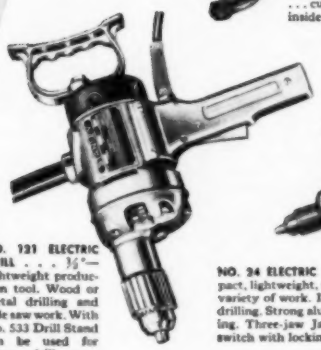
STANDARDIZE ON STANLEY

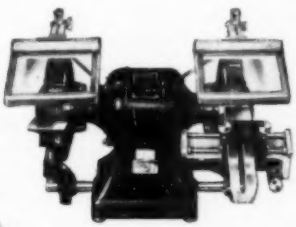
Job-Proved ELECTRIC TOOLS

NO. 218 UNISHEAR . . . Cuts 18 gauge steel at speeds up to 15 feet a minute. Cuts easily right to line . . . curves, angles, straight lines . . . inside or out with hairline accuracy.



NO. 931 ELECTRIC DRILL . . . ⅜"—lightweight production tool. Wood or metal drilling and hole saw work. With No. 533 Drill Stand can be used for heavy drill press work.

NO. 94 ELECTRIC DRILL . . . ¼"—compact, lightweight, sturdy drill for a wide variety of work. Ideal for close-quarter drilling. Strong aluminum die cast housing. Three-jaw Jacobs Chuck. Trigger switch with locking device.



NO. 677 EDGE TOOL GRINDER . . . 7" x 1" wheels, ½ h.p. — designed for industry and school shops. Operates at correct slow speed for edge tool grinding. One wheel for tool grinding, one for general grinding. "Flud-Lite" Eye Shields connected into motor circuit. Patented fixture for grinding plane irons up to 2⅜" and any size chisel.

Stanley Electric Tools, Educational Dept., 480 Myrtle Street, New Britain, Conn.

THE GREATEST NAME IN TOOLS

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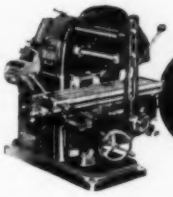
HARDWARE • HAND TOOLS • ELECTRIC TOOLS • STEEL STRAPPING

Atlas PRECISION METALWORKING TOOLS

More pupil stations in minimum space . . . more practical "skill" instruction on the *complete* range of metalworking operations . . . all at low-cost — those are the Atlas advantages.

Atlas DRILL PRESS

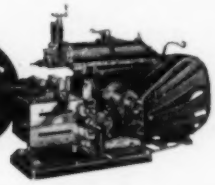
In 12¾" and 15" sizes to instruct on the complete range of metal drilling and tapping as well as many woodworking jobs. Floating spindle for smooth power, ball bearings for enduring accuracy. From $64.50



Atlas MILLING MACHINE

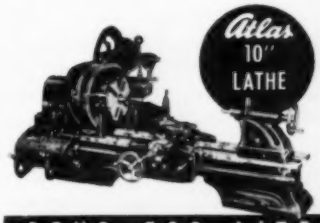
For facing, slabbing, boring, splining — all milling operations. 8 spindle speeds, back-geared drive, Timken bearings. From $305.00

Atlas 7" SHAPER



Handles all shaping operations within 7" stroke. 5 automatic cross feeds both ways, 4 stroke speeds. Quicker, easier set-ups. Extra rigidity for power and accuracy. Timken tapered roller bearings, complete V-belt drive. $355.00

Atlas 10" LATHE



Basic metalworking tool, a workshop in itself! 16 spindle speeds. Timken tapered roller bearings in headstock. In standard change-gear, or quick-change type — Rugged, accurate. From $212.00

ALL PRICES F.O.B. KALAMAZOO, LESS MOTORS

SEND FOR LITERATURE!

Please send me your new Atlas tool catalog.

Name .....

School or Home Address .....

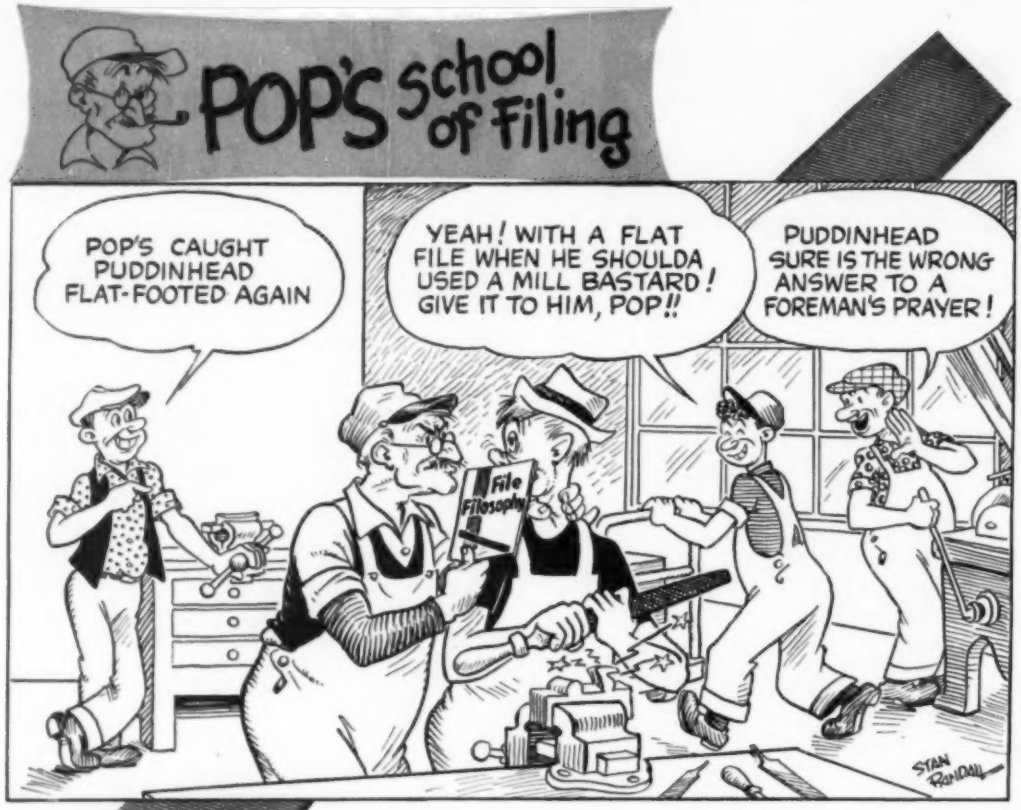
City .....

Atlas Press Company

671 N. Pitcher Street • Kalamazoo, Michigan

Atlas POWER KING

METAL MATCHED PRECISION TOOLS FOR WOODWORKING AND METALWORKING


POP'S school of Filing
POP'S CAUGHT PUDDINHEAD FLAT-FOOTED AGAIN
YEAH! WITH A FLAT FILE WHEN HE SHOULDA USED A MILL BASTARD! GIVE IT TO HIM, POP!!
PUDDINHEAD SURE IS THE WRONG ANSWER TO A FOREMAN'S PRAYER!
File Filosophy
STAN RANDALL

"*Haste makes waste*" —as Pop the foreman, with "blood in his eye," is impressing on a worker using a coarse double-cut Flat file on a job that properly calls for the exacting, smoothing action of a single-cut Mill file.

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This Month's Cover

The cover picture for this month was submitted by Richard Thorpe Jones, Boydton, Va. It shows how electronic devices are tested in the radio laboratory at the industrial-arts department of the North Carolina State College at Raleigh, N. C.

The photograph was made by J. K. Coggin at the North Carolina State College.

The Annual Reminder

To make sure that you may receive the September issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, please give us your permanent address for next year.

The September issue will be mailed to you on or about August 20. If it is sent to your old address it may not be forwarded to you and we most likely will not be able to send you a second copy. Our press runs must still be sharply limited. Sending us your summer address will not do any good because there will be no issue printed between May 20 and August 20.

If you are going to change your address for the school year 1949–50, kindly send us a postal card giving your new address and your zone number together with your former address, and let us have this information no later than August 20.

Still Time to Arrange for Summer School Attendance

Bradley University, Peoria 5, Ill., June 15 to July 21, and July 22 to August 25. **Colorado A. & M. College, Fort Collins, Colo.**, June 20 to July 15, and July 18 to August 12. **Cornell University, Ithaca, N. Y.**, July 5 to August 13. **Oregon State College, Corvallis, Ore.**, June 20 to August 12. **The Pennsylvania State College, State College, Pa.**, June 27 to August 6. **Purdue University, Lafayette, Ind.**, July 25 to August 6, and June 24 to August 20. **State Teachers College, California, Pa.**, June 6 to June 24, June 27 to August 5, and August 8 to 26. **State Teachers College, Oswego, N. Y.**, July 5 to August 12, July 5 to July 20, and August 1 to August 26; general-crafts workshop, July 5 to July 15. **The Stout Institute, Menomonie, Wis.**, June 20 to July 29. **Texas A. & M. College, College Station, Tex.**, June 6 to July 16, and July 18 to August 27. **University of Minnesota, Minneapolis 14, Minn.**, June 13 to July 22, and July 25 to August 28. **University of Southern California, Los Angeles 7, Calif.**, June 20 to July 3, and August 1 to August 27. **Wayne University, Detroit 1, Mich.**, six, eight, or ten weeks, beginning June 27; institute for drafting teachers, August 1 to August 13.

Coming Conventions

June 3. Delaware Vocational Association, at Wilmington, Del. Headquarters, Hotel Rooney. Chairman, Charles H. Dilks, 511 W. 8th St., Wilmington, Del.

June 9–10. Georgia Vocational Association, at Macon, Ga. Headquarters, Macon Municipal Auditorium. Secretary, George Kinzy, Lagrange, Ga.

June 20–23. National Graphic Arts Education Association, at New Technical Trade School, Pressmen's Home, Tenn. Convention chairman, Fred J. Hartman, Room 412, 719 — 15th St., N.W., Washington 5, D. C.

June 21–24. Pennsylvania Vocational Association, at Eagles Mere, Pa. Headquarters, Forest Inn and Lakeside Hotel. Secretary, Henry S. Brimmer, State College, Pa.

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-IAVE-
JUNE . . . 1949

Developing Apprenticeship-Training Curriculums

J. DOUGLAS WILSON
Curriculum Consultant, Vocational and Practical Arts Branch, Curriculum Division
Los Angeles City Schools
Los Angeles, Calif.

Modern engineering advancement, technological development, and manufacturing improvement represent a challenge to human intelligence and craftsmanship that can only be satisfactorily met through organized apprentice training programs.

Instructional materials for apprenticeship are developed with the same meticulous care and detail that is applied to the development of college curricula. Representatives from the vocational divisions of federal, state, and local educational agencies meet with industrial committees of management and labor groups to determine the curricula content of apprenticeship courses, based upon time tested standards of industrial training achievement.

The related technical and supplemental phase in an apprenticeship training program refers to the technical knowledge required of an apprentice to master his trade. This information is usually organized into units of work each covering one phase of related technical information such as mathematics, layout, blueprint reading, etc. It is advantageous, however, to make a complete outline of the entire trade including manipulative or *doing units*.

The major strength of curricula for apprenticeship classes lies in an approval by apprenticeship committees. Once an approval is given to a training program, the instructor is placed in a strong position because any unfavorable reaction to the program can quickly be cleared by merely stating "The apprenticeship committee has approved this program and if you think it should be revised I will arrange for you to see the committee."

This procedure of first obtaining the approval of the apprenticeship committee may, at first glance, seem to place the committee in the light of directing the instructional program, and this would indeed be true if the training program were developed independently of public school authorities. However, in a sound apprenticeship program, of course this does *not* happen. The school authorities take the lead and create the proper relationships that result in a training program that meets the approval of all concerned. The school co-ordinator or supervisor should guide committees into the right channels of program development keeping them fully informed as to what constitutes the elements of a sound apprenticeship training program.

The curriculum division of the Los Angeles city schools in charge of Assistant Superintendent, Maurice G. Blair, covers many fields such as art, music, vocational and practical arts, homemaking, commercial education, science, mathematics, English, etc. The practical and vocational arts branch under the direction of head supervisor, Claude E. Nihart, some months ago added a curriculum consultant whose major responsibility is to prepare instructional materials for apprenticeship classes. With the exception of bricklaying, painting, and plastering, which are day school programs, the apprenticeship classes in the Los Angeles city schools are held in various evening schools.

This article describes the approach to the problem of developing apprenticeship curricula and the procedures followed, and illustrates some of the programs already completed.

It should be noted that the trade and industrial education division of the California state department of education established a curriculum laboratory in 1946 which is very successfully preparing and producing apprenticeship curriculum materials on a state-wide basis for a number of trades. The state plan of approach and the approach used by the Los Angeles city schools curriculum consultant parallel each other quite closely. The efforts of both are well co-ordinated so that there is no overlapping.

Operational Procedures

The procedures used in developing training program outlines for apprenticeship classes, as described below, are producing satisfactory results.

1. The supervisor of apprenticeship education for the city schools, William H. Cole, is responsible for over fifty different apprentice training programs. Many of these programs are active, others are in the developmental stage.

The major part of his work is that of meeting with various apprentice committees, working on details pertaining to apprentice agreements, checking on physical requirements for proposed new classes and discussing the details of the training program. If curriculum materials and outlines are available he proceeds at once to the organization of the class. If there is no curriculum available the problem is turned over to the curriculum consultant to develop a training program.

NOTE: Generally, apprenticeship training programs deal solely with related technical and supplemental subjects. However, manipulative units are sometimes added upon recommendation by the apprenticeship committee. This necessitates providing a shop facility, as the content of the training program determines the kind of physical facilities needed. In some cases there may not be a similar day trade class and, therefore, no tools nor equipment are

available. In this case, the tools and equipment needed must first be ascertained before proceeding with the class organization work.

2. The curriculum consultant in cooperation with the apprenticeship committee forms an advisory curriculum committee composed of several of the best craftsmen in the trade and employers who have a full understanding of the actual work processes. A committee of six to eight persons is sufficient.

3. At the first meeting of the committee the conference method of procedure is described. Using the U. S. Department of Labor Occupational Dictionary a suitable definition is selected covering the worker in the trade to be analyzed. If necessary, this definition is modified or adjusted to meet the local conditions.

4. The next step is to determine the different occupational divisions into which the trade divides itself, or, it may be, the breakdown is made on the kind of work performed by the journeyman. This step is taken to clarify the thinking of all present and to *direct* the discussion into definite channels.

5. The committee members are now asked to state what the workers actually *do* in their occupation. A list is made on the blackboard with no attempt to arrange it in an orderly form until it is completed; it is then rearranged into its logical order.

6. Now comes the most important step in the analysis of the training program curriculum. The conference leader asks: *"What does the craftsman have to know in order to do the jobs which have been listed?"* To persons familiar with apprenticeship the question is obvious as the school training emphasizes the technical phases of the trade. This is as it should be, as technical skills necessary to a qualified journeyman cannot adequately be learned on the job because conditions do not permit *time out* to teach apprentices.

The technical units are listed on the blackboard and then evaluated by the committee in the order of importance or order of teaching presentation. At this time similar items or topics are combined.

7. By the time the related subjects topics have been outlined the evening is gone, the blackboard is full and the secretary, who has taken the notes, (this is very important) is a bit weary trying to keep up and catch up with the numerous changes made during the discussion period. The meeting is therefore adjourned with the understanding that detailed minutes of the discussion are to be prepared and sent to the committee members for study and correction. When edited to conform with these suggestions the minutes are retyped and committee approval secured.

NOTE: In order that they may obtain firsthand information, it has been found advantageous to have the school co-ordinator, and the instructor who is to teach the class, present at the meeting.

8. When the minutes are in final form the curriculum consultant prepares a master training program outline. Experience gained through meeting with many committees has proved that the most satisfactory method of presentation is to make a chart of the outline. This chart shows such items as: the name of the course, a definition of the worker, the breakdown of the occupation into its occupational spread, the manipulative jobs performed by the journeyman and lastly, a list of the technical units to be taught.

9. The chart is presented to the committee, corrections made, final approval obtained, and so noted at the bottom of the chart. Photostats of the chart are made and presented to each member of the committee, the principal of the school, the trade co-ordinator and, the teacher. Instructions are also given as to what units, other than technical, are to be taught. Bricklaying and plastering are good examples of trades that require manipulative instruction as neither of these trades can be taught effectively unless actual practice work is done.

NOTE: Too much emphasis cannot be placed on the value of training-program outlines. A training outline is an excellent device to guide the instructor and keep him *on the track*. Secondly, it is invaluable to a new apprentice because it shows, at a glance, what he must master during his school training program. Thirdly, it is an aid to the supervisor as an evaluation device. Fourthly, some committees have requested that the chart outline be reduced to 8½ by 11 in. and sufficient copies reproduced to enable each apprentice to have a copy for his notebook. This outline is presented to each new apprentice at the time he is indentured.

10. Apprenticeship programs vary in length from two to five years. However, the average length is four years. The curriculum outline must, therefore be divided into yearly periods and covering class sessions of four hours per week per year.

The illustrative charts do not show yearly periods because it is not possible to set up arbitrary time limits of the various units until after the instructor has gained experience in teaching the course.

11. The actual development of curriculum content now begins: planning the actual lessons and writing informational materials covering such topics as blueprint reading, mathematics, layout, etc. Instructors are responsible for doing some of this work; however, too much cannot be expected of an evening school trade extension instructor who is employed at his trade eight hours per day, therefore, this phase of the curriculum development is assigned to the curriculum consultant. Space in this article does not permit enlarging on this phase of the work.

Guide for Course Construction

A common interpretation of the meaning of terms used to describe various units in a training program is essential to an intelligent development of an apprenticeship training program. The following definitions have been agreed to for use in the Los Angeles city schools.

I. *Manipulative Units*

Production or Technical Jobs: Production or technical jobs requiring use of materials, tools, and machines, includes safety instruction.

Safety: Taught as a part of each production job related information students must have in order to do intelligently the practical work of the trade. Safety instructions cover the knowledge and understanding of hazards involved in the practical work of the trade and the precautions necessary to do the work with safety for the individual and for others.

II. *Technical Units*

Trade Terms: Special words that are used in any given trade or occupation in connection with doing the job. These will, in general, relate to materials, machines, tools, operations, and processes.

Tools and Equipment: Information about tools and equipment used in the trade, and their proper use and care.

Materials of the Trade: Information the learner must have in order to recognize the different kinds of stock, and to become familiar with their working properties; source of supply, and processes of manufacture.

Applied Mathematics: Use of tables, formulae, technical hand books, and special devices for solving problems requiring mathematical solutions.

Trade Drawings:

Blueprint Reading: Interpretation of blueprints and specifications to determine the kinds of materials, methods of construction, and finished dimensions required.

Shop Sketching: Dimensioned freehand sketching of construction details and parts.

APPRENTICE-TRAINING PROGRAM FOR WOOD FLOOR WORKING

DEFINITION: Floor layer:- Lays strip and parquet wood floors by nailing, or on mastic or asphalt base; sands floor surface using power equipment; finishes floor using filler, stainer and wax.

DIVISIONS OF THE FLOOR LAYER'S OCCUPATION

STRIP & PARQUET FLOOR LAYING:	MASTIC FLOOR LAYING:	MACHINE SANDING:	FINISHING:
Inspection - picking Layout - Laying - Patching	Layout - Prime - Waterproof Spread mastic - Lay floor	Using drum-rotary edger Hand scraping	Inspection — Mixing materials Applying filler, stain, wax, etc.

TRAINING - PROGRAM TECHNICAL UNITS

SAFETY:
- Lime dust — Damaging building
- Flying nails — Fire hazards, dust, mastic

MATERIALS:

Lumber - kinds:
- oak - birch
- maple - beech
- gum - pecan
- ash - etc.

Lumber characteristics:
- hardness - moisture
- porosity - grain

Fasteners:
- Nails, brads & screws
- Glue (for patch jobs)

Sandpaper:
- Kinds and grits

USE, CARE & MAINTENANCE OF TOOLS:

hammers	squares:
nail sets	framing
saws	combination
chalk line	bevel
planes: rabbett	hand ax
block	pry bar
jack	chisels
brace & bits	rule
scraper	wrenches

INSPECTION:

floors; jambs & base; fireplace opening; subfloor

specifications: nail information; dimensions of flooring; deadening

BLUEPRINT READING:
- Basic fundamentals: symbols, plan views
- elevations, sections, plan interpretations

LAYOUT:

direction of floor; starting line; angles; aligning

parquet floor: squaring room; circular room; bay window; fireplace

METHODS OF LAYING:

Nailing:	Mastic:
strip floor	strip floor
parquet floor	parquet floor

POWER EQUIPMENT: Hook-up & operate:
- skilsaw - table saw - router - electric drill - polishers - stone

METHODS OF SANDING:
- rotary - drum - edger

HAND SCRAPING:

MATERIAL LISTING

INDUSTRIAL RELATIONS

TRAINING PROGRAM CONTENT SUGGESTED BY:
Harold Sturgeon — Harry Walther
L.E. Zieschang — B.S. Watson - W. Chisnell
Members: Hardwood Floormasters Local 2199

APPROVED BY:
Wood Floorworking Industry
Joint Apprenticeship Committee
February 2, 1948

CHART PREPARED BY:
J. Douglas Wilson, Curriculum Consultant
Los Angeles City Schools
February 2, 1948

LOCKSMITH APPRENTICE-TRAINING PROGRAM

The Locksmith must be a salesman as well as a mechanic. A small business man he must and as well as repair.

Los Angeles City Schools

DEFINITION: A locksmith is a craftsman who repairs locks, changes lock combinations, opens locks, and makes new or duplicate keys. He also replaces and installs new locks.

TRADE FIELDS

Residential Buildings	Commercial Buildings	Public Buildings	Manufacturing Plants	Luggage Repair	Automobile Locks	Door Closer Repair

TRAINING PROGRAM

MANIPULATIVE UNITS

FIRST YEAR	SECOND YEAR	THIRD YEAR
Equipment:- Identification & maintenance Hand Tools:- Use and maintenance. Duplicating Keys:- Flat - bit - paracentric - double-sided Warded Locks:- Rim - mortise - padlock - cabinet Construction and repair Fitting keys Automobiles:- Opening Replacing lock springs Luggage Locks:- Construction and repairs Fitting Keys to warded types Safety Practices:- To self — To materials To equipment	Lever Tumbler Locks:- Rim - mortise - padlock - cabinet - Principles & repair - Key fitting - Changing combinations Automobile Locks:- Construction and repair Disk or Wafer Tumbler Locks:- Principle and repair Schlage wafer Key fitting - Changing combinations Code Keys:- Use of code machine Door Closers:- How to hang and adjust Lock Installation:- Rim - mortise - Dorein Pin-Tumbler Locks:- Mechanism and repair Setting up a cylinder Changing combinations	Opening Locks:- Hand picks Picking gun Other methods Fitting Keys:- Impression method Use of hand vise Use of impression gun Disk-tumbler locks Lever-tumbler locks Pin-tumbler locks Electric door openers:- Construction and repair Master Keying:- Lever-tumbler locks Disk-tumbler locks Pin-tumbler locks Safes:- Changing combinations

TECHNICAL UNITS

Key Blanks:- Kinds and use Nomenclature:- Parts identification Trade terms Metals:- Use in lock construction The Hand of Doors Lock Types and Uses:- Rim — mortise - Dorein Manufacturer's Service & Aids The Locksmith & his Responsibility To the Public & Manufacturer	Lock Security:- Warded - disk - lever - wafer and pin tumbler Codes:- How to use code books Automobile Locks:- Systems and kinds Door Closers:- Determining correct size Service Helps:- Special types of locks Allied Merchandise Trade Ethics	Governmental Regulations:- Restricted Keyways:- Master Keying:- Advantages and disadvantages Special systems and keyways How to lay out a system Safe Information:- General survey Blueprint Reading Trade Science Estimating Materials and Labor

SALESMANSHIP UNITS

Stock Display Personal Appearance Mannerisms Selling principles	Order Taking Billing The locksmith as a merchant Selling principles	Buying:- Quantities and prices Shop management Selling principles

ABOVE OUTLINE PREPARED BY:
Paul Dunn, Instructor, Apprentice Training, Los Angeles City Schools

APPROVED BY: Los Angeles County Joint Apprenticeship Committee, Nov. 6, '48

CHART PREPARED BY: J. Douglas Wilson, Curriculum Consultant, Los Angeles City Schools

CHEFS AND COOKS APPRENTICE-TRAINING PROGRAM

DEFINITIONS—*CHEF* (hotel & rest) *A general term used to designate anyone who is in direct charge of food preparation.*

COOK (hotel & restaurant) *A person who prepares, seasons and cooks, by any method, meats, soups, vegetables, sauces and gravies, works at an establishment having only a few kitchen employees. If job covers all of duties of a chef he is known as COOK, HEAD.*

OCCUPATIONAL DIVISIONS

CHEF
COOK:
- *sous - chef*
- *second cook*
- *garde-manger*

COOK (continued)
- *relief cook*
- *roast cook*
- *fry cook*
- *pantryman*
- *vegetable cook*

BUTCHER
PASTRY MAN
BAKER

Note: A relief cook can do all of above.

TRAINING-PROGRAM UNITS

MANIPULATIVE UNITS:—

1. Supervising Kitchen Staff:—
   - *hiring*
   - *directing*
   - *food preparation*
   - *food storage*
2. Buying and Checking Merchandise:—
   - *quality*
   - *price*
   - *quantity*
3. Preparing Menus

TECHNICAL UNITS:—

1. Terminology
2. Ethics
3. Equipment and Tools
4. Safety Methods:—
   - *health*
   - *safety*
   - *labor regulations*
5. Safety Laws
6. Kitchen Sanitation:—
   - *purposes and use of—*
     - *cleansers*
     - *sterilizers*
7. Knowledge of Station Work:—
   - *cooking*
   - *baking*
   - *butchering*
   - *decorating*
   - *pantry work*
8. Handling Employees
9. Public Relations
10. Food Chemistry:—
    - *refrigeration*
    - *diets and climate*
11. Food Control:—
    - *market conditions*
    - *salable merchandise*
    - *portion control*
    - *balanced menu*
12. Labor Costs
13. Food Service

ACKNOWLEDGEMENTS— ABOVE OUTLINE SUGGESTED BY: *Chefs de Cuisine Association of California and Junior Circle, Inc. March 23, 1948*

CHART PREPARED BY:- *Douglas Wilbur Curriculum Consultant, Voc. & Pract. Arts Dept., Curr. Division, Los Angeles City Schools*

APPRENTICE SIGN-PAINTER TRAINING PROGRAM

DEFINITION: *A craftsman who paints signs by hand on any kind of material or surface.*

TYPES OF WORK PERFORMED

Painting signs on:-	Building and erecting:	Cutting stencils:	Pictorial Advertising:
glass — walls - cards trucks - auto - signboards	*sign boards*	*using silk screen process*	*all types on any material*

TRAINING PROGRAM UNITS

TECHNICAL — *MANIPULATIVE*

SAFETY:
- *To self — To others - To equipment*
- *Fire hazards of the trade*

MATERIALS:
- *Cloth — Metals — Paints - Wood*

USE OF TOOLS, EQUIPMENT AND RIGGING:

TRADE MATHEMATICS:
- *Fundamentals of arithmetic*

LETTERING: *The four basic alphabets:*
- *Script — Roman*
- *Gothic — Text*

COMPOSITION:
- *Layout and advertising*

COLOR HARMONY

COLOR MIXING

APPLICATION OF PAINTS TO VARIOUS SURFACES:
- *Wood — Cardboard*
- *Brick — Glass*
- *Metal — Cloth*

BLUEPRINT READING:
- *Required only to the degree the apprentice can interpret a sketch of a signboard drawing*

APPLICATION OF LEAF:
- *gold — silver — aluminum*

BUILDING SIGNS:
- *practice joinery*

MIXING COLORS

LETTERING SIGNS
- *cards — glass*
- *wood — metal — etc.*

CUTTING STENCILS

LAYOUT

NOTE: Above units to be taught in the classroom on a small unit or practice basis.

PICTORIAL PAINTER

The apprentice pictorial painter must take:
1. *All units as listed*
2. *Additional* training in:-

LIFE CLASSES

STILL LIFE

ADVANCED COLOR HARMONY

NOTE: Now classes will probably not be needed for these units as existing art classes can be used to provide the training required.

TRAINING PROGRAM DEVELOPED BY:- Van Copeland — John L. Gahret, Edward A. Burgess Local #831 - Charles Schlenger

APPROVED BY:- Los Angeles Joint Apprenticeship Committee, *Feb 13, 1948*

CHART ANALYSIS BY:- *Douglas Wilbur Curriculum Consultant, Los Angeles City Schools*

Layout: Layout of templates, patterns, and construction details.

Applied Science: The application of scientific principles that must be understood in order to perform a job effectively. Understanding of the changes that take place in materials during processing. Methods of protecting materials from deterioration from exposure to the elements. Effects of temperature on the processing of materials.

Laws, Codes, and Ordinances: Federal, state, and local legislation that regulates industrial practices in the interests of health and safety.

Trade Processes and Methods: Knowledge of various work processes and methods used in the trade.

III. *Industrial Relations Units*

Personality Characteristics: Qualities that make for success on the job: Work habits, occupational discipline, wholesome social attitudes, citizenship, occupational competence, co-operation with fellow workers.

Health and Safety: Keeping fit for the job: employer's concern for safety of workers; proper ventilation and light; prevention of fire hazards; dressing safely for work on the job.

Working Conditions: Working hours; wage plans; rest periods; job security; special privileges; insurance plans.

Laws That Affect Workers: Federal, state, and municipal laws that affect the worker, his job, his trade, and his industry; workmen's compensation; social security; unemployment insurance; health insurance.

Employer-Employee Organizations: Employer and employee organizations that concern the worker; what their functions are and the responsibility of worker to them.

Employment Opportunities: Extent to which experiences in one trade can be used in other trades and industries. Opportunities to grow and advance.

Growth of the industry, its scope and trends, its relation to other industries that support it.

Summary: A summary of the advantages of the procedures used in developing apprenticeship curricula follows:

1. Development of training program outlines proceeds in an orderly manner along well-defined lines.

2. Final results provide acceptable training programs which are co-ordinated with *on the job* experiences of the apprentice.

3. Apprentices appreciate the value of school training and have respect for the training program when they realize that it has been approved by leaders of their trade or craft.

4. Instructors are guided and directed in their teaching.

5. All persons connected with the program know exactly what it is to be taught and what school facilities are needed.

6. The apprentice education supervisor is assured of a plan of approach which is adaptable to any new program.

7. Lastly, and of equal importance to any of the items enumerated in the foregoing, good will is engendered for the public schools because of their practical approach and leadership displayed in directing the development of related and supplemental content of apprenticeship-training programs.

Recording and Weighting Industrial-Arts Grades

JOHN F. FRIESE
Professor of Industrial Arts Education
The Pennsylvania State College
State College, Pa.

Teachers who are real educators admit that one of their lesser qualifications is that of scoring pupils' work, grading, and arrival at final grades based upon factors of determined relative importance. Conscientious industrial-arts teachers are even more concerned because of varying degrees of emphasis upon any of several of aims, because of manual and informative content, because of the creative individual project aspect and because of growing emphasis upon the development of desirable traits, attitudes and appreciations gained through interpretation of very real lifelike educative experiences. Additional complexity results because of required and elective

CHART FOR RECORDING SCORES & DETERMINING FINAL GRADES

IN INDUSTRIAL ARTS
(On a 100% or 100 Point Basis)

SHOPWORK
Quality = Approx. ½ of Perfect
Quantity = Approx. ½ of Perfect

Course:
Sec:
Grade:
Term:

	Prob. 1 or Week 1	" 2 or " 2	" 3 or " 3	" 4 or " 4	" 5 or " 5	" 6 or " 6	"	"	"	"	"	"	Total = Approx. 40 points	Theory-Unit 1	Theory-Unit 2	Theory-Unit 3	Total = Approx. 20 points	Effort, Interest, Attitude, Appreciation	Total = Approx. 20 points	Tests, Examinations	Total = Approx. 20 points	TOTAL SCORE & FINAL GRADE	Absences
Perfect Scores	7	7	7	7	7	7							42	7	7	7	21	5	5	5	20	6	6	17	100	
John Doe	2	3	2	2	3	3							28	6	7	6	19	4	4	3	15	5	5	14	76	
	2	2	2	2	2	3												4								
John Smith	3	2	3	2	3	3							37	5	4	5	14	4	4	4	17	4	5	13	81	
	4	3	3	3	4	4												4								

Fig. 1

CHART FOR RECORDING GRADES & DETERMINING FINAL GRADES

IN INDUSTRIAL ARTS

Course: Design I A
Sec:
Grade: Jr
Term: 1946-1947

Grading System
3(A) = 2.5 to 3
2(B) = 1.5 - 2.5
1(C) = .5 - 1.5
0(D) = 0 - .5

Shopwork & Information - Jobs or Weeks

	1 Art metalwork	2 Plastics	3 Leatherwork	4 Basketry & weaving	5 Orn. concrete	6 Wood carving	7 Furniture	8 Rules of design	9 Orn. ironwork	10	11	12	13	14	15	16	17	18	Ave. = 3/5 of final grade
Ashley, J.C	3	3	3	3	3	3	3	3	3										3
Gooding, L	2	2	3	2	2	2	3	2	2										2.4
Mitchell, G	1	0	0	1	1	1	0	1	1										.7

Tests

	1 Original, Jr. H.S.	2 Original, Sr. H.S.	3	4	5	6	7	8	Ave. = 1/5 of Final grade
Ashley, J.C	3	3							3
Gooding, L	2	3							2.5
Mitchell, G	1	0							.5

Traits

	Work habits	Cooperative attitudes	Interest and effort	Appreciations	Ave. = 1/5 of final grade	Total: 4 weighted averages	Mathematical grade	Final grade	Absences
Ashley, J.C					3	15	3	3	
Gooding, L					2	10	2	2	
Mitchell, G					0	2.6	.5	1	4

Fig. 2

courses, and because of both handcraft and trade and industrial aspects.

We must know the things that are to be accomplished before we can establish a grading chart for each particular course. Pupils often express their irritation of, and their contempt for, the inadequacy and unfairness of many present procedures in grading, and of the determination of final grades.

What Has Been Accomplished — A study of magazine articles, professional books, unpublished grading devices and formal educational researches of the past quarter century reveals frequent attempts to improve this unsatisfactory situation. One is impressed with the variety of teaching factors in industrial arts which have been the objects of more exact definition and subsequent grading. Newkirk and Green in *Testing in Industrial Education* list 15 different phases of instruction in industrial arts (not subjects, activities, or units) which lend themselves to measurement.

Up to now the greatest contributions to better grading seem to lie in efforts to analyze, define, and place those factors to be graded or scaled in a scheme of relative positions of importance. A further step is quite notably lacking, namely formulating charts or forms which can be adapted to the varying conditions found in different courses, grades, and shops in industrial arts. The chief divisions of such charts must provide for an adaptable recording scheme showing progress in accomplishing the chief characteristics and contributions of each subject course as defined by its aims. The chief divisions also need to be arranged so that in their entirety they can be weighted for relative importance in arriving at a final grade. Finally they should provide a ready means of calculating a final grade on the basis of any of the variety of grading systems found in our secondary schools.

Desirable Factors of a Valid Grading Plan — In industrial arts we must recognize the fact that one standardized form, in all details, cannot be formulated. It must:

1. Be adaptable to all shop and drawing courses or shop *areas*.
2. Reflect the three generally accepted types of educative experiences: What the pupil should be able to do. What the pupil should know. What the pupil should be.
3. Be objective in form.
4. Be adaptable to a variety of established grading systems in secondary schools.
5. Be adaptable to weighting in its main divisions as a reflection of the relative importance of stated aims of a specified course.
6. Provide a ready means of translating scores and grades into final grades.

CHART FOR RECORDING GRADES & DETERMINING FINAL GRADES

IN INDUSTRIAL ARTS

Course: Printing
Sec:
Grade: 10
Term: 1946-1947

Grading System
4(A) = 3.6 to 4
3(B) = 2.8 - 3.6
2(C) = 1.2 - 2.8
1(D) = .4 - 1.2
0(F) = 0 - .4

Shopwork - Jobs or Weeks (Minimum Requirement)

	1 Regd. job 3 (test)	2 " " 8	3 " " 9	4 " " 11	5 " " 12	6 " " 13	7 " " 14	8 " " 18	9 " " 19	10 Paper cutting	11 Locking form	12 Complete project	13	14 Extra job 1	15 " " 2	16 " " 3	17	18	Ave. = 2/5 of final grade
Degree, R.M.	3	3	4	4	4	3	4	4	4	4	3	4	3	4	4	3			4
Madison, J.	2	3	3	1	3	3	3	2	1	2	2	3	3	2					2.5
Ziegler, W.V	1	1	1	0	1	1	0	1	1	1	0	1	1	1					.9

Information Units

	1 Regd. job 7 (test)	2 Figure paper stock	3 Regd. job 16 (test)	4 " " 20	5 " " 21	6 Lesson plan	7	8	9	10	11	12	Ave. = 1/5 of final grade
Degree, R.M.	3	3	4	4	3	4							3.5
Madison, J.	3	2	2	2	2	3							2.5
Ziegler, W.V	1	0	0	1	0	0							.3

Tests

	1 Mid-term test	2 Final exam	3	4	5	6	7	8	Ave. = 1/5 of final grade
Degree, R.M.	3	4							3.5
Madison, J.	1	2							1.5
Ziegler, W.V	0	0							0

Traits

	Work habits	Cooperative attitudes	Interest and effort	Appreciations	Ave. = 1/5 of final grade	Total: 4 weighted averages	Mathematical grade	Final grade	Absences
Degree, R.M.	4	3	4	4	3.8	15.2	3.8	4	
Madison, J.	3	3	3	3	3	11.2	2.8	3	
Ziegler, W.V	1	2	2	1	1.5	4.7	1.2	1.5	4

Fig. 3

Examples of Charts for Recording and Final Weighted Grading — Some of the desirable features of forms for recording progress and arriving at final grades are illustrated in the three examples shown in Figures 1, 2, and 3 with their accompanying descriptions. A study of them by an ingenious teacher will reveal how widely any of them can be changed or adapted to specific course conditions, and how well they are suited to grading industrial-arts work.

The two general types of charts have been evolving over a period of years. Student teachers have made suggestions. They have been tried out in secondary schools and in teacher education courses. We need additional formal research on these aspects of our problems in grading. We also need continuing attempts by teachers on the job to solve this vexing problem of an adequate yet simple procedure for recording scores and grades and in arriving at final grades which reflect the aims, character, and particular emphasis of each course.

The arrangement, Figure 1, for recording scores in shopwork and on other factors in industrial arts, and arriving at a final weighted grade is based on the plan of having the perfect student earn 100 per cent, or 100 points in a term. The four principal classifications (shopwork, information, traits, tests) could be renamed, reweighted, added to or reduced so long as the total score remains 100. The highest number of points for each recorded subscore, and the *exact* number of points for each of the four principal classifications will vary depending upon the number of items in each classification, and upon the relative importance of the particularly determined main classifications. The main classifications should be determined and weighted in conformity with the importance of the several aims of the course.

In Figure 2 the arrangement for recording shop and other grades in industrial arts and arriving at a final weighted grade is based on a 3–2–1–0 (A–B–C–D) system of grading (with no percentage equivalents). For the course illustrated, the four principal classifications on the chart have been reduced to three: shopwork *and* information, tests, and traits. The character of the course, including its aims, is such that the shop and information parts cannot well be separated for grading purposes. Hence the *information* section of the chart has not been used and the *shop* section has been weighted at three fifths of the total final grade, and renamed. A ninth subdivision has been added. This example illustrates how the main divisions of the chart may be adjusted to meet the varying characteristics of different industrial-arts courses. The shop average is, of course, multiplied by three in this case and the averages for tests and traits added, and the total then divided by five. It can readily be seen how a chart of this kind can be divided into three, four, or six parts with weighting of the final grade on the basis of thirds, fourths, or sixths.

In Figure 3 the arrangement for recording shop and other grades in industrial arts and arriving at a final weighted grade is based on a 4–3–2–1–0 (A–B–C–D–E) system of grading (with no percentage equivalents). The shopwork grades include both of the chief factors, quality and quantity. In the cases of the first two students extra jobs beyond *minimum requirement* were completed and those students' final grades for *shopwork* were increased somewhat as calculations will reveal.

A study of the *grading system* in this case reveals that it is composed of five levels, and that it approaches a normal curve in distribution. Here, as in Figure 2, the various accomplishments of this course are divided into fifths, 2/5–1/5–1/5–1/5. Again, it would be very simple to modify the chart form if it seemed more justifiable to split the shopwork and other achievements into thirds or fourths or sixths.

Additional Adaptability — In addition to adapting the titles and relative weights of the main divisions on which scoring or grading is done, and the number and kind of subdivisions (Figs. 1, 2, and 3), it should be evident that adaptations of the *grading system* is likewise possible. For example, it has been used with a 3, 2, 1, 0, —1, —2 grading system. It is quite obvious that the plan is adaptable where the percentage system of scoring and final grading is used.

The Printing Teacher and His Aims

GEORGE J. MILLS
Instructor of Presswork
Carnegie Institute of Technology
Schenley Park, Pittsburgh, Pa.

We printing teachers are a smug group. For years we have taught with assurance that ours was a course whose existence in the curriculum could be justified easily. We have taught thousands of students how to hand set type and to feed a platen press, and all the while have felt that we were teaching printing.

With the printing industry turning to a trend toward normalcy the time has come to judge our efforts. If granted that objectives are the foundation of our individual courses of study and our methods, then we should reconsider our objectives both in terms of the changing needs of the student and the many changes which have occurred in the printing industry.

All of us may well be reminded that foremost we are teachers of human beings destined to live in American democracy. Secondarily, we are teachers of printing. First, therefore, we should review the general aims of education in a democracy as so aptly stated in the *Cardinal Principles of Secondary Education*, the *Functions of Secondary Education*, or the *Social-Economic Goals for America*, all developed by the National Education Association.

Following general aims, consider the objectives which we may fulfill as industrial education teachers, as contrasted with the academic subject teachers. In 1934 the American Vocational Association formulated 12 *Standards of Attainment* which apply to virtually every printing teaching situation. In addition, many leaders in the industrial education field have determined objectives important to us. For example, Fryklund and Bedell listed 12, all worthy of consideration, in this magazine in 1939.

Objectives Required for Each Specific Situation

An analysis of aims of general education and of industrial education leads us into consideration of objectives for each teaching situation. Obviously, no two teaching situations are exactly alike. Therefore, each printing teacher needs to determine how best to fulfill these general and area objectives in his position. Follow by formulating those objectives which determine course

methods and content in the specific area of printing in one school.

Emphasis is placed on the absolute necessity of adding individual course objectives to general and industrial education aims. Also, no group of objectives for one specific printing course will entirely fit other printing teaching situations.

In planning objectives we should consider the peculiarities of location, age level, length of time available for instruction, nature of instruction needed (for appreciation, consumer knowledge, avocation, or vocation), equipment available, and any other factors which may affect the welfare of the students.

There is a variance of objectives within printing education based upon whether the study is one of appreciation or consumer knowledge taught on the industrial-arts plan, or is vocational with longer time allotments for instruction. Logically, the industrial-arts printing teacher should exercise judgment in selecting objectives of value to the student, and which, at the same time, do not spend the student's time educating him for printing as a lifework. The vocational printing teacher needs to choose those objectives which are basic to the laying of a foundation for the student's learning about the industry in preparation for specializing upon entrance into the industry.

Twenty Sample Objectives

Following are twenty objectives offered for use as a starting point for thinking about objectives to apply to any particular printing teaching job. These were picked at random from several printing courses. No attempt is made to relate them or to arrange them in any sequence.

1. Initiate and develop an understanding of the three major basic graphic arts reproductive processes: letterpress, planography, and intaglio.

2. Acknowledge and define several of the minor graphic arts processes, for example, silk screen, mimeograph, photostat, etc.

3. Illustrate inherent relationships of the major processes. For example, each process has a common problem of preparation of suitable copy.

4. Explain the place of competition and free enterprise in the American printing industry as typical of the national industrial picture.

5. Develop elementary skill in self-expression through use of the printer's layout.

6. Provide enough experience in hand and machine operations that the student will develop a feeling of self-reliance and confidence in his ability.

7. Using printing as a basis, lead the student toward an understanding of the value of possessing skill at a trade.

8. Promote an understanding of the importance of printing in everyday American life.

9. Influence qualified students to consider some phase of the graphic arts as a lifework.

10. Introduce the student to practical application of skills in printing, as contrasted with theoretical use taught in the classroom.

11. Develop skills in fundamental techniques to assist the student to decide which specialized branch of the industry to enter.

12. Continue to develop habits of orderly procedure and self-discipline.

13. Develop skills in judging good printing from poor.

14. Inspire the student with the heritage of the printer and promote in him an appreciation of craftsmanship as a means of passing on this heritage.

15. Justify the necessity of trade ethics.

16. Arouse interest in the problems of the laboring man in the printing industry, with attention to advantages and disadvantages of printing as compared with other vocations.

17. Foster an appreciation of scientific developments in the various branches of the industry, using history as the basic approach.

18. Guide the student into job opportunities in that area in which he shows most promise.

19. Develop an interest in and understanding of labor unions and employers' organizations as related to the printing industry.

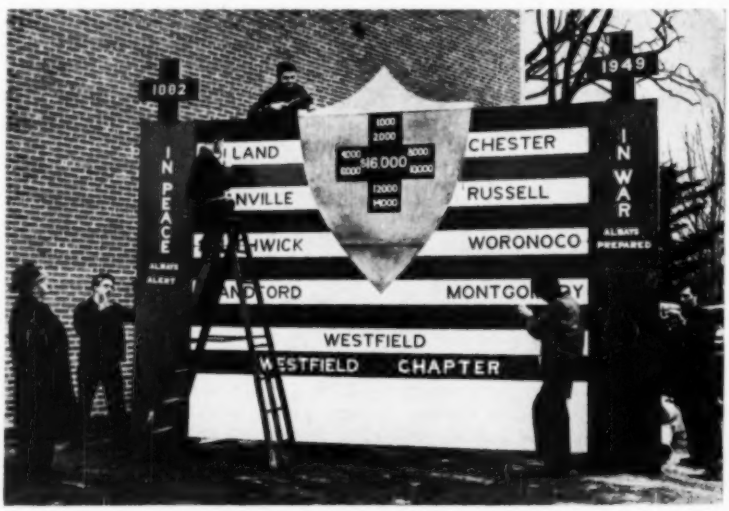
20. Inspire the student with desire to continue his learning after completion of formal education through use of trade periodicals, books, and visits to plants using new developments.

Note should be taken of emphasis that there are three major printing processes rather than just letterpress which we so often refer to as "printing." At present relief printing is becoming less a part of the total printing produced. Printing teachers should acknowledge this trend and make an effort to show its importance, even though they may not be in a position to give instruction in planography and intaglio. Plant visitation is a helpful tool in illustrating the rise of newer processes.

We Must Continue to Learn

So long as we aspire to be successful teachers, we must remain diligent as students of both our human charges and our subject matter. Some of us graduate from teacher training schools with a lot of theory in method but surprisingly little information about the subject which we are to teach. Conversely, others of us have entered as teachers directly from the printing trade and, though thoroughly versed in our trade, are at a loss regarding the efficient methods of teaching others.

This matter of continuing to learn prob-



Red Cross quota board constructed and created by students from the woodworking department of the Westfield Trade School, Westfield, Mass. Shown, left to right are: Instructor Arthur A. Bieg, and Donald Chaffee, Frank Kondrat, Richard Hansen, Franklin Wellspeak, and Gordon Baker

— Robinson Photographic Laboratories, Westfield, Mass.

ably is the weakest link in the foundation of most printing teachers. We cannot overlook the fact that student attitudes and desires are changing. To be successful teachers we must have the *personal objective* of keeping up-to-date in the study of the human race and how to apply ourselves to its improvement.

Furthermore, we cannot ignore that the printing industry no longer is a simple trade of hand setting type and feeding a platen press. If we are to teach consumer knowledge, let us know our industry and illustrate to the student the endless varieties of graphic reproduction and the dependence of the American way of life upon the printed word. If we are to teach printing as a vocation, let us assist every student toward fitting himself into that specialized branch of the industry wherein he may be most successful and happy.

We Must "Sell" Printing Education

As a group we consistently have been indifferent to the attitudes of others toward us. The result has been ill feeling from printing employers and tradesmen who do not understand our objectives, from parents who consider the subject as perhaps another educational frill, and from administrators who object to the high per capita cost of the printing classroom.

We need to secure understanding by and good will from these groups. Too many of us justify our existence in the school system by the production of some school supplies, and ignore the vastly greater importance of printing education as a means of improving the lives of our students.

We must make it our individual objective to become acquainted with the parents of our students, perhaps through the Parent-Teacher organization, through advertising of the objectives of the course to be taken home by the student, and through invitations to the parents to visit our shops.

We must make it our individual objective to call upon local printers, so that they can become acquainted with us. We must explain our programs to them, ask for suggestions for course content and method, and in other ways invite the cooperation of the industry.

Finally, we must make every effort to advertise our printing classes to fellow teachers and school administrators. We may co-operate and secure help in return by illustrating the importance of printing in our way of life. We may show the many possibilities of using printing effectively to teach command of fundamental processes, citizenship, health and other attributes set forth in the objectives of general education.

Some Leaders in Industrial Education

WILLIAM T. BAWDEN

Director of Publications
Kansas State Teachers College
Pittsburg, Kans.

(Continued from page 191 of the May, 1949, issue)

William Elmer Roberts (Continued)

Near the close of the school year, June, 1893, Roberts was moved up to increased responsibilities when he was appointed supervisor of all manual training work in the Cleveland schools by Superintendent Andrew S. Draper.

The selection of Mr. Roberts for this assignment was only one of innumerable moves of great educational significance made by Dr. Draper. For this reason it is appropriate to digress at this point to record the high points in his educational career.

Superintendent Andrew S. Draper

Andrew Sloan Draper was born at Westford, N. Y., June 21, 1848, and died at his home in Albany, April 27, 1913. Following graduation from law school, he practiced law, 1872–75; served as state superintendent of public instruction, Albany, N. Y., 1886–92; superintendent of city schools, Cleveland, Ohio, 1892–94; president, University of Illinois, 1894–1904; returned to Albany as the first State Commissioner of Education, from 1904 until his death in 1913.

Dr. Draper made a notable contribution to the reorganization and development of the University of Illinois, which, under his leadership as president, 1894–1904, emerged from relative mediocrity to an outstanding position as one of the great state universities. Another great public service was rendered in Albany, N. Y., first as state superintendent, 1886–92, and later as commissioner, 1904–13, where he left an enduring monument in the foremost state department of public instruction.

Co-ordinate in importance with these significant achievements were the accomplishments of his brief tenure as superintendent of the Cleveland city schools, 1892–94. After years of preliminary study and effort the people adopted a new system of organization and administration of the city schools which soon became known all over the country as "the Cleveland Plan." The plan and its methods of operation were studied by delegations of educators, members of boards of education, legislators, and others from all parts of the United States as well as from abroad. The essential features of the plan were adopted and put into effect in many other communities.

I must not take the space here to go into the details of the Cleveland plan. The most significant feature was the elimination of outside (especially political) influences, and the centering of responsibility and authority for the conduct and operation of the schools in the office of a single professionally trained executive, the superintendent of schools, appointed by and responsible to a policy-making board of education. As noted previously, this was one of the conditions prevailing in the Cleveland schools that appealed to Mr. Roberts, and which was one of the determining factors in his decision to embrace the opportunity that seemed to open up before him.

There are two main reasons, in my opinion, why the friends of industrial arts in public education should remember with gratitude the record of Dr. Draper as superintendent of the Cleve-

land schools. First, was his recognition of the leadership qualities of Mr. Roberts, and his appointment of the latter to the newly created position of supervisor of all manual training instruction in the Cleveland schools. Coupled with this appointment was the announcement of a policy to extend the advantages downward from the high schools, and to develop a city-wide program of appropriate activities beginning with the kindergarten and continuing through the high school. The wholehearted support and encouragement of Mr. Roberts in the development of this program, initiated by Superintendent Draper and continued through the years by his successors, was a decisive factor in the success of the movement.

It should be emphasized that the appointment of Mr. Roberts in June, 1893, as supervisor, with instructions to proceed with the development of the comprehensive city-wide program as described, was an innovation. Very few cities as large as Cleveland had taken this step at that time. While I probably should not venture the statement without a search of the records, I recall only two other large cities that established city-wide programs of manual training designed to serve all grades from the kindergarten through the high schools before Mr. Roberts began his work in Cleveland. John A. Chamberlain began work on a similar assignment in Washington, D. C., in the fall of 1887. Frank M. Leavitt, after several years as teacher of shopwork and principal, was appointed principal of manual training schools, Boston, Mass., in 1892, and in 1906 he became assistant director of drawing and manual training. Those were indeed pioneering days. There were few precedents, and practically no demonstrated principles or accepted conclusions, to guide the newly appointed supervisor in the evolution of a huge program.

Recognition of the Teacher

The second reason for remembering Superintendent Draper's administration was his adoption of a policy of refusing to appoint teachers of manual training who did not possess special fitness for the work, including at least a good foundation of general scholarship, supplemented by special professional preparation for the subject or subjects to be taught. This point deserves some emphasis. Teachers of industrial arts in the late 1940's have little appreciation of the struggle that went on in the early stages of the manual training movement to establish the conception that this new work was a subject to be "taught," and that if it was to succeed as an essential part of the education of youth it must be committed to "teachers" who were adequately equipped and prepared to teach it.

In the early days, in too many instances, the manual training program was started by putting the school janitor or some other "handy man" in charge of it. Because of exceptional personal qualifications, exceptionally intelligent supervision and guidance by an alert principal, and for other reasons, some of these experiments succeeded sufficiently well to lead the way to better things, as better qualified personnel became available. Many of these experiments failed utterly to produce the expected results.

Mr. Roberts himself encountered this attitude of inability to appreciate the significance of adequate preparation for the work of teaching manual training. At the time when Roberts first went to Cleveland, September, 1890, meetings of the board of education were held in a large room at the rear of the first floor of the old Central High School building. This building had been abandoned for school purposes when the new high school was completed. The room was fitted out with a heavy semicircular rail terminating at one end of the room in a raised platform occupied by the desk of the president of the board. The space within the rail was given to the desks and chairs of the members of the board. Visitors, newspaper reporters, patrons with petitions to submit, and others with business to transact with the board, remained outside the rail.

At that period the board consisted of 20 members representing the various wards of the city. The members made up a fairly representative cross section of Cleveland society. The meetings were described as democratic, spirited, and at times even acrimonious.

It appears that Mr. Roberts had been employed by the manual training committee, upon the recommendation of the superintendent, but his appointment had not been brought before the board for ratification. Consequently the matter of salary had been deferred until the report and recommendation of the committee could be considered by the board. At the meeting at which this appointment was to come up for discussion, Roberts was invited to appear before the board. Mr. Roberts recalled the circumstances as follows:

"At this meeting the question of my salary came up. In the course of a long and heated discussion, a fiery saloon keeper from the West Side jumped to his feet, waved his arms excitedly, and yelled, 'Who is this man from Boston, anyhow? Ain't we got enough good carpenters in this town?' Finally the question of salary was laid on the table until the next meeting. In the meantime I managed to get along through the generosity of a sympathetic and trusting boardinghouse keeper."

It is highly significant that, when other superintendents were temporizing with this problem and accepting something thought to be "just as good" as good teaching, Superintendent Draper understood the factors involved, and more than 55 years ago enunciated a sound policy, and the underlying reasoning, so clearly. Here are his own words:

"In the selection of teachers in the manual training work, preference has been given to men of general education and special training and preparation, over men who were mechanics and perhaps skilled in their work, but without experience or gifts as teachers. I am well aware that there has been some feeling about this, particularly on the part of some mechanics of the less skillful sort who have had their desires for positions disappointed. Nothing is clearer to me, however, than that in our manual training this policy must be invariably adhered to.

"No person is entitled to higher respect in any community than skillful mechanics of well-ordered lives. But it is well known that it requires persons of sound general education and special pedagogical training to teach anything effectually, so it requires persons of as much mechanical skill as is practicable, but particularly of special study and training in the theories of manual training and its relation to other schoolwork and to all the public interests, as well as in methods of arousing interest, transmitting knowledge, and training the eye and hand to move exactly, and to express freely the results of a continually awakening intelligence. If we do not go beyond the mere training in mechanical skills and lift men and women to a higher intellectual and moral grade through this class of schoolwork, we shall come short of accomplishing what is expected.

"To do this we must adhere to the policy of employing specially trained teachers. Such teachers are not very numerous at the present time, and it is difficult to secure them. . . . Unless manual training schools demand such teachers there will be little to lead persons to prepare for it; if they are demanded the supply will soon be adequate. The point is in my judgment vital. Unless this policy is generally adopted and rigidly adhered to, the manual training work will languish, and under the inexorable laws which govern all such matters it will finally go to the wall."

This problem was of something more than academic interest as late as the early 1920's. Teachers and others who are old enough to remember conditions that prevailed at the time of

World War I know that many an industrial-arts teacher who was called away by the draft or by war industry was replaced by the school janitor or by some other mechanic possessing none of the professional qualifications of the trained teacher.

Conditions were somewhat different during and following World War II. Again, many industrial-arts teachers were called away by the draft and by war industry. But this time we know that many superintendents and high school principals closed their industrial-arts shops "for the duration" in preference to trying to keep them open as places merely for "busy work." School officials, and school patrons as well, seemed to have progressed to the point of recognizing the difference between the results accomplished by a well-organized industrial-arts program administered by a competent and adequately trained teacher and the activities that might be carried on by a mechanic who, no matter how skilled a craftsman he might be, nor how acceptable personally he might be otherwise, is not equipped with the understanding of educational philosophy demanded of a "teacher." It is a great testimonial to the high quality of service rendered by the industrial-arts teachers of today that this radical change in the point of view of school administrators has come to pass.

A Notable Administration

Referring again to the adoption of "the Cleveland Plan," it was clearly recognized that no plan, however well conceived, would work itself. If there was indeed to be a "new day" in the city schools of Cleveland, the quality of the leadership in this transition period was of prime importance. To this end, it was decided not to promote someone already in the system to the post of superintendent, but to invite an educator from the outside, who might find it somewhat easier to keep himself free from the inevitable conflicts of objectives, ideals, influences, and personalities of the old regime and the new. From what has been said, it is not difficult to believe that Dr. Draper was exceptionally well qualified to discharge this function of able and inspiring leadership during the initial critical period of reorganization. His entire career was a demonstration of his ability as an organizer, administrator, and educational statesman.

Looking back on that period, Mr. Roberts is of the opinion that among these changes two of the most important were the decentralization of authority and the emancipation of the principal.

Under the old regime the schools had been administered almost wholly from headquarters. Teachers were responsible directly to supervisors with respect to all matters having to do with courses of study, methods of teaching, organization of subject matter, and promotion of pupils. Cases of discipline, of both pupils and teachers, were handled at the central office. "I happened to be present, unavoidably, at some of these functions. They were certainly very trying and very weepy affairs."

It should be noted that at this period the principals of all schools below the senior high schools in Cleveland were women. The position of the principal was difficult and unsatisfactory, since she was only nominally in charge of her school, and vested with only a minimum of authority and responsibility. Her duties were confined almost wholly to statistical work, the keeping of records, the preparation of reports, and the mechanical routine of the building organization.

All this was changed under the new order set up by Superintendent Draper. The principal became the responsible head and manager of the school. The teachers in each school were responsible to the principal, who was expected and encouraged to exercise educational and personal leadership.

The principal now was held responsible not only for the direction of the school, but for the handling of all cases of discipline, if possible without appeal to the supervisors or to the superintendent. The principal was also charged with the responsibility of seeing that instructions and regulations promulgated by the central office were carried out.

Summary of Achievements

I bring this discussion of Superintendent Draper's administration to a close with a brief reference to the 58th Annual Report of the Cleveland Board of Education, for the year ended August 31, 1894. The report includes an instructive summary of 20 specific items of progress or achievement during the two-year period. All are significant, but I mention only the following nine:

1. Improper influence has been completely eliminated from the appointment of teachers. . . . Promotions and assignments have been put wholly upon the basis of merit and adaptation; and continuance in service has been dependent on competency.

3. The powers and functions of the school principal have been greatly enlarged, and the position has been made one of new consequence.

6. An entirely new and different, and more sympathetic and helpful system of supervision has been established. Greater freedom and more originality of action (on the part of teachers) have been encouraged and secured.

7. The theory of management of pupils by teachers has been wholly changed. . . . The relations between teachers and children have been made more stimulating; spontaneity has been encouraged; control has been imposed only up to the point of promoting instruction.

8. A detailed course of study has been prepared and published for the first time in Cleveland.

9. The manual training work in some phase has been extended to all grades of the elementary school.

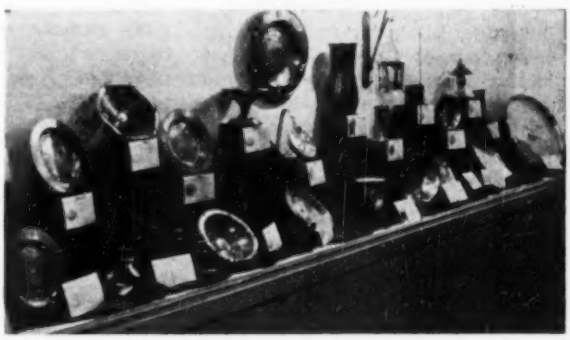
10. Cooking schools and sewing schools have been introduced.

11. Simple science work has been carried into the elementary schools, and elementary history has been carried farther back.

14. An entirely new plan has been adopted with the view to giving more efficient help to the slower or unfortunate pupils.

As you ponder these trenchant, definitive statements, do not overlook the significance of the fact that this educational platform was constructed practically "out of whole cloth" (to mix the metaphor) more than 55 years ago!

(To be continued)



Industrial-arts exhibit. See article on page 237. Submitted by James O. Reynolds, instructor of general metals, McKinley Occupational School, Dayton, Ohio

— Photograph by John Thomas Newell, Chicago, Ill.

Industrial Arts and Vocational Education

John J. Metz, Editor

INDUSTRIAL INNOVATIONS OF INTEREST TO SHOP TEACHERS

Industry is always doing surprising things with the everyday materials with which we all are acquainted.

Thus the Western Pine Association has just recently announced that its research experiments with white fir have permitted them to so alter this softwood that it becomes a super hardwood which is from three- to ten-fold stronger, and ten times harder than the original natural wood from which it is produced.

It also is resistant to chemical attack, cigarette-proof, alcohol-proof, and the final product retains its natural wood grain intact.

Discoveries of this type are not only interesting to those who actually use the new product, but they form excellent interest arousing items for the related materials used in the school shop. Our students like to read about things like this, and it is well for the teacher to keep his eyes open for such bits of information which can most profitably be added to his regular lesson material.

The name Staypak has been given to this new product. It is obtained by taking a whole board — any softwood of low resin content may be used — and compressing it to approximately one third of its original thickness, under a pressure of fifteen hundred pounds per square inch, at a temperature of three hundred twenty-five degrees Fahrenheit.

The heat causes the natural lignin in the wood to flow, and this acts as a cementing agent so that no other bonding material is required. Once pressed, the board will not lose its shape under subsequent atmospheric changes.

Another interesting item of information is the fact that a new aluminum paint has been perfected which prevents mold and rot, on wood and other organic surfaces.

Aluminum particles and other agents specially combined, form the new pigment which can be mixed with the usual vehicles designed for standard aluminum paints. It is then ready for application and tests have shown that surfaces can be masked and sealed in one application.

It is especially suitable for coating fence posts, mine timbers, marine pilings, ships and boats, foundations and structural work of wooden bridges, greenhouses, mushroom cellars, bathhouses, swimming pools, as well as food storage and processing plants.

Another new development of an old industrial process is the vertical retort process for condensing zinc.

For approximately a hundred years, according to the New Jersey Zinc Company, horizontal retorts, also called Belgian retorts, were used. Each condensed about thirty pounds of zinc per day. There was no commercial experience on which the design of a larger retort could be based.

Considerable experimentation then developed the present vertical type which is more compact, recovers more zinc and requires less cleaning.

ANNUAL CONVENTIONS SHOW SIGNS OF STRENGTH

It is indeed heartening to report that the annual conventions are again with us in full force. To mention just one example: the twenty-first annual convention of the Michigan Industrial Education Society which was held at Grand Rapids on April 21, 22, and 23, had not only a splendidly arranged program to present, but an attendance that was outstanding in numbers, and a list of commercial exhibitors which exceeded that of some of the national association conventions.

One is accustomed at the Michigan conventions that they start out with breakfast meetings, which are then followed by a morning session, a luncheon meeting with a speaker, an afternoon meeting or a series of demonstrations, and then a dinner with one or more speakers to take any spare time.

What is more, the members of the Michigan organizations have learned to work together harmoniously. At the same time and place that the Michigan Industrial Education Society held its convention, the Michigan Home Economics Association, the Michigan Association of Teachers of Vocational Agriculture, and the Michigan Vocational Business Education Society held their meetings. Some of the general programs gave all of the various groups the opportunity to meet together. Seemingly, none of these separate organizations are too much afraid of losing their identity, and by the appearance of things, all those present seemed to have both a profitable and an enjoyable time.

What was said of the Michigan annual meeting might be repeated with the same emphasis for those that were held by the New Jersey Vocational and Arts Association, Illinois Vocational Association and Illinois Industrial Association, California Industrial Association, Texas Vocational Association, Pennsylvania Industrial Arts State Conference, New York State Vocational and Practical Arts Association, Indiana Industrial Education Association, Wisconsin Association for Vocational and Adult Education, and other associations that will hold their 1949 conventions in the near future.

THE HUMAN ELEMENT

The editor's attention was called to the fact that he could have made the list of institutions offering summer sessions for teachers of industrial arts and vocational education both in the blurb on page 21A, and in the editorial on page 194, in the May issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION much more inclusive.

He freely admits the truth of the assertion. It is not with a purely mercenary motive that most of the institutions enumerated in the two lists in the May issue are those that advertised their summer sessions in our magazine. It is just common sense that those schools who believe in the efficacy of our advertisements get a little special consideration from us. If we wanted to enumerate all of the teacher training colleges that are offering summer school courses for teachers, supervisors, directors and administrators of the industrial arts, vocational education, and vocational guidance fields, the list would naturally be much longer than the ones which we offered in the last two issues. But there were other schools mentioned that were not advertisers. Undoubtedly some were omitted that should really have been listed. We are sorry.

We are again calling attention of our readers to summer school offerings on page 11A. Look them over, take your choice, and improve your opportunities for a better future.

Selection, Preparation, and Presentation of Subject Matter

DONALD F. HACKETT
Head, Division of Fine and Practical Arts
Georgia Teachers College
Collegeboro, Ga.

After the industrial-arts teacher has decided upon his objectives and the type of program to be offered, and after he has planned and organized his shop, he is ready to plan and launch the program to attain these objectives. The three most important steps in planning the program are as follows:

1. Analyzing the subject matter to determine the experiences and information which are to constitute the program and permit the attainment of the objectives.
2. Arranging the experiences and information into effective teaching units.
3. Preparing instructional materials in order that teaching may be most effective.

Analyzing the Subject Matter

The first step in analyzing the subject matter is to select the industrial fields to be included in the program. Beginning courses should be general, exploratory courses designed to provide a variety of industrial experiences. These courses should include units in sketching and/or mechanical drawing, woodworking, metalworking, electricity, plastics, leathercraft, printing, transportation, etc. Succeeding courses may be general courses in the above fields, providing an opportunity for the students to increase their knowledge and experience in any field. In no case should a single activity or unit shop constitute the entire shop organization of a school. Where only one shop can be organized the composite general shop will prove to be most practical.

After the fields have been selected a study of the experience and information requirements in each will reveal the elements that will contribute most to success. In the American Vocational Association bulletin, "Improving Instruction in Industrial Arts," and in most state industrial-arts bulletins, the experiences and information of basic importance to most of the principal industrial fields may be found. If the instructor will consult these lists while analyzing the chosen fields he will find that they are of considerable help in selecting the important elements in each field. It is important to bear in mind that in selecting the elements to constitute the course, the maturity and interests of the students, the shop facilities, and the ability of the instructor must be determining factors. Having done this, the instructor will have a list of the things the student should be able to do and the things he should know. Needless to say, no instructor should select objectives he cannot attain, teaching elements he cannot teach, or units that will be of little or no interest to his students.

As the last step in analysis it is necessary to select the elements from the lists that will contribute most to the attainment of the chosen objectives. The resulting lists will contain manipulative skills, principles, information, procedures, and factual material.

Arranging the Teaching Units

The second step in planning the program is the arranging of the previously selected elements into teaching units based on the procedure involved in giving instruction. To accomplish this it is necessary for the instructor to select projects that meet the following seven conditions.

1. The projects should involve some of the elements previously listed.
2. They should be of genuine interest and value to the group for whom they are intended.
3. They must be within the capacity of the student yet difficult enough to offer a challenge.
4. They must be suitable to existing shop conditions.
5. They should have some intrinsic value in the community.
6. The students should be able to complete them in a reasonable time.
7. The projects should embody good design.

In some situations it is advisable that these projects be considered as "suggested projects" and the students allowed to select projects containing the same or similar elements.

On the basis of the projects selected and the elements involved it is now possible for the instructor to arrange these elements in order of relative importance and frequency of use. In general all manipulative and informational elements should be grouped in order under the headings, "What the student should be able to do," and "What the student should know," respectively. From this arrangement the instructor may now develop his teaching units (course of study) in the order in which they will be required.

The form on page 232 shows an analysis and the arrangement of the true elements that might be selected as representative of the skills involved in sheet-metal work. Notice that the instructor may tell at a glance the nature of the elements he must teach and the order in which they must be taught. The form also lists the informational topics that are included in the units.

Preparing Instructional Materials

The last step in planning the program is the preparation of instructional materials in order that teaching may be most effective. The term instructional materials as used here includes such devices as lesson plans, lesson outlines, instruction sheets, charts, maps, diagrams, pictures, blueprints, models, mock-ups, films (slide, strip, sound, and silent) and all other sensory aids to teaching.

The truly efficient and effective teacher never attempts to present a subject to his class without some form of instructional material at hand. This may be only a lesson plan and lesson outline, or a combination of both. Nevertheless, he knows that regardless of his years of experience it is possible for him to forget parts of the material he has planned for the class. In addition the outline makes continuity of presentation possible.

Lesson Plan

Prior to meeting each class the instructor should list the topics he intends to cover, whether they be informational or demonstrational in character. Under each topic he should also list the important points in order that nothing may be omitted.

The following lesson plan is given as an example. This particular lesson plan is intended for use with a class entering the shop for the first time.

FIRST CLASS MEETING

Before the class arrives:

1. Prepare student information cards.

(These cards should ask for the students' name, address, birth date, hobbies and interests, parents' names and occupations.)

2. Be sure tools and equipment are in perfect condition.

3. Have all tools and materials ready for the first demonstration.

4. Prepare to explain the purpose and nature of the course. Have projects ready for display.

5. Plan safety program.

6. Visualize the class as completely as possible.

7. Prepare to greet the class cheerfully. After the class arrives:

1. Pass out information cards. These cards are to be filled out and returned to the instructor in order that he may become better acquainted with his students.

2. Introduce yourself to the class.

3. Explain purpose and nature of course and shop procedure. Display projects made by previous classes, or by yourself.

4. Tour shop and briefly explain purpose of equipment.

5. Discuss safety in the shop and explain safety procedures that will apply to the class.

6. Ask if students have any questions.

7. Assign student lockers and work stations.

8. Pass out job assignment sheets and explain their use.

9. Demonstrate the first operation. Steps of demonstration should be listed.

10. Pass out material and start class to work.

NOTE: (1) The foregoing 10 steps should require no more than 30–35 minutes. (2) Discipline in the shop is not mentioned because it should not be brought up until its need is apparent. Rules of conduct should then be developed by the class with the instructor's guidance.

Lesson Outlines

Lesson outlines refer mainly to the outlines used in presenting informational material to the class. A lesson outline may be a part of a lesson plan. This outline presents the main topics and the items included in each topic and is used to remind the instructor of each item and to maintain the continuity of the presentation.

Instruction Sheets

Instruction sheets is the term used to include the Operation Sheet, Information Sheet, Job or Informational Assignment Sheet, and the Job Sheet.

The Operation Sheet presents the steps involved in performing a specific operation and is titled "How to Sharpen a Drawing Pencil," "How to Grind a Bevel Edge Tool," etc. A decade or two ago very little information was available in this form. Today a great variety of very satisfactory operation sheets are available in book or manual form and the need for the instructor's writing this type of material is limited to special operations.

The Information Sheet presents selected information on a subject and is usually titled, "How Nails are Made," "The Story of Iron," "The Requirements, Opportunities, and Working Conditions in the Foundry," etc. Information sheets are also available today in printed form; however, it is sometimes necessary for the instructor to prepare information sheets on special subjects that are not available in printed form.

The Assignment Sheet may take the form of a Job Assignment Sheet or an Informational Assignment Sheet and is concerned with assigning the student to a particular job or to the task of reading a reference, visiting a factory, or in some other manner gaining information on his own accord. They are usually titled, "To Make a Utility Box," "To Visit an Industrial Drafting Room," etc.

Very few good assignment sheets are available in published form, therefore it remains for the instructor to prepare his own. In the present-day shop and especially the Composite General Shop or Laboratory of Industry the proper use of assignment sheets can change the instructor's teaching task from one of drudgery to one of pleasure and result in teaching efficiency never before dreamed of.

Job Assignment Sheets are prepared after the instructor has selected the elements and the projects for a course. The sample Job Assignment Sheet, which will appear in the next issue, illustrates its form. The Sheet presents the job in its entirety. The numbers in the parentheses following the learning units and steps of procedure refer to the pages in the listed references that describe the operation or procedure. Where adequate references are not available the term demonstration is inserted, to designate the steps the instructor is to demonstrate.

UNIT IN SHEET METAL WORK

What the student should be able to do:	*Project* Utility box	Funnel	Quart cup	Ash tray
1. Read working drawing.	x	x	x	x
2. Make out a bill of material.	x	x	x	x
3. Plan the procedure for the job.	x	x	x	x
4. Measure and lay out with a rule.	x	x	x	x
5. Develop and lay out rectangular forms.	x			
6. Cut sheet metal with snips.	x	x	x	x
7. File sheet-metal edges.	x	x	x	x
8. Clean sheet metal.	x	x	x	x
9. Form sheet metal with hand tools.	x	x	x	x
10. Hem sheet metal.	x			
11. Drill holes in sheet metal.	x			
12. Rivet sheet metal.	x			
13. Prepare cut acid flux.	x	x	x	
14. Clean, tin, and care for an electric soldering iron.	x	x	x	
15. Solder sheet metal.	x	x	x	
16. Develop and lay out conical forms.		x		
17. Fold and set a lock seam.		x	x	
18. Use a wiring machine to wire an edge.		x	x	
19. Use stakes in forming sheet metal.		x	x	
20. Develop and lay out cylindrical forms.			x	
21. Roll a sheet on a roll former.			x	
22. Burr with a machine.			x	
23. Make a setting down seam by hand.			x	
24. Bend with a machine.			x	
25. Raise or bumpsheet metal in a form.				x
26. Anneal copper.				x
27. Give a hammer finish to copper.				x
28. Chase a design in copper.				x
29. Polish copper.				x
30. Apply lacquer finish.				x

What the student should know:

1. Sheet-metal tools, names and parts.
2. How to care for tools and equipment.
3. How to identify sheet metals.
4. How sheet metals are produced.
5. Sizes and shapes of sheet metals.
6. The composition of sheet metals.
7. The kinds of solders and their uses.
8. Fluxes and their use.
9. Occupational information, including requirements, opportunities, and conditions in the industry.

With these sheets in use it is possible for individuals to progress at their own rate; the instructor is relieved of the burden of repeating countless demonstrations and is free to supervise his class more closely; and in addition he is relatively certain that every member of his class experiences the manipulative activities he has selected as most important.

The use of the job assignment sheet is especially valuable in starting a new class to work in that the usual confusion is completely eliminated. As the class advances the job assignment sheet may be gradually modified to the point where the student finally prepares the entire sheet after securing the instructor's approval on a project of his own choice.

The informational assignment sheet presents all the instructions, references, and questions necessary to launch the student on the solution of a problem. The student's research may be presented in a written report or orally before the class. As in the case of the job assignment sheets these sheets may best be prepared by the instructor to most fully utilize the facilities and opportunities at hand.

The job sheet presents *all* the necessary information and the detailed steps of procedure involved in carrying a job through to completion. It is usually titled "To Electroplate a Metallic Article," "To Build a Birdhouse," "To Make a Box Kite," etc. Job sheets should be reserved for more or less special cases in the shop where available printed instructional material will not satisfactorily fill the needs.

Charts, Maps, Diagrams, Pictures, Blueprints

These instructional materials are valuable in reinforcing the usual lecture or informational discussion in that they are another avenue down which to drive home an idea. Many aids of this nature are available to instructors, free of charge, from most large industrial concerns.

(To be continued)

Some Statements Prepared for the Vocational Teachers of Hesse, Germany

HOMER J. SMITH
Professor of Industrial Education
University of Minnesota
Minneapolis, Minn.

(Continued from page 193 of the May, 1949, issue)

C. Vocational Teacher-Training Briefs

I. *Comparison of Our Former Teachers*

"It is pleasant for those of us who have closed our formal schooling to look back across the years and to revel in the memory of persons and events. It would be profitable for those of us who now instruct to attempt to characterize the small group of teachers who served us best and who really pleased and enthused us. In my own case it was the teachers who were versatile in attack — to whose classes we youngsters went without sureness of what would happen — from whom we trouped away again with satisfaction born of the breaking of monotony. Those teachers who had only one method — who exacted a uniform response — who advanced by "rule of thumb" — and who would not be distracted or diverted have been almost forgotten. The adaptable, casual, yet purposeful ones are remembered and revered. They taught us most, led us easiest and pushed us farthest. They are most entitled to respectful memory."

NOTE: The foregoing paragraph is from a magazine article by Dr. Smith — *Variety in Class Conduct*, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Vol. 21, pp. 349–350, Dec., 1932 (Current Comment Series, No. 7).

II. *Four Major Responsibilities of Vocational Teachers*

1. Vocational teachers must develop some *skills*. They must train their students *to do* the things that are required in the occupations concerned. By the use of tools, machines, instruments, materials, etc., they must supervise some learning projects and jobs. They must insist on appropriate standards of work in all of the practice assignments in which their students engage. These standards will differ according to occupations and according to the purposes and levels of the schools.

2. Vocational teachers must impart some related and technical *information*. They must aid their students *to know* some things. This information, like the skills, will vary with the vocations or with the particular projects and jobs to be done. Technical information becomes increasingly important in the world's work. There are three kinds of such information and every course must contain all of them — *first*, things that a person must know in order to do the work, to prevent accidents, and to save materials — *second*, other facts about equipment, materials, and work conditions that are not absolutely needed to do the work but which make school days and employment years more interesting — and *third*, guidance facts about the occupation, so that each student may be aware of opportunities and requirements in his field and know the place that his vocation occupies in the state economy. (*Necessary* information, *nice-to-know* information, and *descriptional* information, for each occupation taught.)

3. Vocational teachers must stimulate some *appreciations*. They must bring their students *to feel* some things. Just as teachers of literature motivate reading of the finest authors and writings, so must vocational teachers build emotional reactions to the best things in their lines. These best things will differ in the several fields or occupations, and the individual teachers will be able to select and decide. In music these appreciations might be for certain compositions, harmonies, themes, or movements. In carpentry or patternmaking or wood carving they might be for original designs, sturdy constructions, appropriate woods, exact and easy craftsmanship, and the beautiful finished product. In some other field a high respect might be built for accuracy, dexterity, and speed. Instructors have the great opportunity, also, to teach high regard for persons who make important contributions to human welfare. Also, for persons who are good examples of friendliness, fair dealing, and fine democratic living.

4. Vocational teachers must build some good *attitudes*. They must encourage their students *to act* in manly and womanly ways. All teachers have this responsibility but vocational teachers have a comparatively better opportunity. They find it easier to improve respect for property, to lead toward co-operative endeavor, and to train for leadership. They can help much in the matter of employer-employee relations.

Review of the Four Duties

Skill ..... to do
Information ..... to know
Appreciation ..... to feel
Attitude ..... to act

III. *Ten Prime Resources of the Teacher*
1. Good character and personality
2. Possession of the vocational skills
3. Knowledge of related information
4. Culture, consistent with the foregoing
5. A clear concept of the school's purposes
6. Ability to select functional content
7. Understanding of course construction
8. Command of varied teaching techniques
9. Plans for class management and routine
10. Desire to improve as a teacher

IV. *Ten Traits To Be Continually Developed*
1. Good relationships with parents, fellow workers, and school officials
2. Excellent use of the language employed
3. Stimulation of interest and motivation of learning
4. Recognition of the fact that individuals differ
5. Patient, fair, and encouraging attitudes toward students
6. Inclusion of social materials in all courses
7. Skillful use of textbooks and reference works
8. Employment of visual teaching aids
9. Helping the whole class, a small group, or one student
10. Measurement of the results of instruction

A Brief Training Course for Conference Leaders

F. LYMAN TIBBITTS
Vocational Adviser, Veterans Administration
Los Angeles, Calif.

Setting the Stage

I. Getting the meeting place in order.
   a) Arranging the lighting.
   b) Arranging for ventilation.
   c) Arranging for proper seating.
II. See that equipment is ready.
III. Have all materials on hand in time.
IV. Begin the meeting on time — quit on time.
V. Make meeting plans in advance. Allow time for the unexpected.
VI. Prepare key people in advance.
VII. Some rules to follow:
   a) Leader or keyman will present problem.
   b) Leader starts the discussion.
   c) Leader participates in discussion on same basis or other.
   d) Individuals should talk to each other and not to the leader.
   e) All should be encouraged to participate.
   f) Leader must keep control of the meeting.
   g) Individuals should talk one at a time.
   h) Bring out opinions and feelings.
VIII. On planning the meeting's progress.
   a) Lead the group to state the problem — then define it.
   b) Determine the purpose or aim.
   c) Opening remarks should be outlined.
   d) Select the motives to be used.
   e) Outline steps for development of the problem.
IX. Conclusion of meeting.

SETTING THE STAGE

Importance of Good Conference Leading

Every supervisor will on occasions be called upon to lead a meeting. Some meetings will be only routine matters such as making announcements, or calling attention to errors committed by only one individual if it is the first of a kind and has a general application. However, there will be occasions when the supervisor will be called upon to lead a meeting in which a serious problem is to be discussed, and in such cases he needs skill in conference leading. Efficiency in this phase of the supervisor's work is just as important as mechanical efficiency and very often more so.

If as many as ten people participate in a conference for one hour, ten hours of valuable time is being used. Thus such a conference must be worth the ten hours of time taken. This ten hours should be as productive, if not more so, than an equivalent amount of time on the job. To make this conference as productive as other work the best of conference techniques should be used. These techniques can and should be learned but it will require time, energy, and study. One may read a description of how to operate a machine, drive a rivet, fit a skin, install a piece of equipment or make a tool, but skill in doing the job is perfected only by persistent and effective practice. Needless to say this practice, to be most effective, must be supervised. That is the purpose of these meetings — principles will be outlined but it must be followed by much practice to acquire skill.

IN LEADING CONFERENCES FIVE MAJOR STEPS SHOULD BE TAKEN.

1. Setting the stage — getting the meeting place in order, determining and defining the problem and motivating it.
2. Gathering the facts or data.
3. Organizing the facts.
4. Drawing conclusions.
5. Making applications.

SETTING THE STAGE.

Setting the stage for a conference involves: (1) arranging for proper lighting, (2) arranging the ventilation, and (3) arranging the proper seating.

Good lighting is an asset to any conference. It should not be conspicuously bright or dull. Conferees should not be compelled to face a light, neither should the conference leader have to face a window or an artificial light. Either of these situations distract attention because they make individuals uncomfortable, thus destroying interest and initiative.

Poor ventilation, like poor lighting, will limit the success of an otherwise satisfactory conference. Bad ventilation encourages stupor and nonactivity, both physical and mental. Who likes to sit in a stuffy room, let alone try to think under such conditions? Although bad ventilation does not make mental activity much less effective under concentrated conditions, it does make it more difficult if the problem does not hold an intense interest in itself. Lack of good ventilation makes the individual sluggish and sleepy.

Seating arrangements may make or break a conference. A good conference practically demands seating so that individuals face each other rather than the conference leader. Individuals need the inspiration that comes from observing the expressions of those who are taking part in the talking. People are stimulated and ideas arise as a result of these facial expressions as readily as from the words that are spoken. In many cases the inspiration is even more effective. However, when the two are simultaneous, seeing and hearing, the most ideal situation maintains. Therefore, *seat conferees so that they can see*

the faces of other participants, either by the use of tables or an arrangement of chairs.

SEE TO IT THAT EQUIPMENT IS READY.

Equipment for a conference consists of chairs, tables, blackboard, or a paper substitute for a blackboard. Sometimes machines for projection of pictures and charts are essential equipment for a conference.

Too much equipment as well as too little may be detrimental to a conference. Too many chairs promiscuously arranged, distract from a conference. Too many tables in a room may decrease the effectiveness by at least 10 per cent. On the other hand too little equipment will have an equally bad effect. One chair missing, a conference table that is too small, and the absence of other essential equipment often makes an effective conference all but impossible. *Be sure that all necessary equipment is on hand and in place.*

ALL MATERIALS ON HAND AND READY.

Materials are a vital part of a conference. Papers, pencils, erasers, duplicated materials, and the like should be on hand and easily accessible. Much time is wasted in conferences because someone failed to bring the proper supplies or materials or perhaps it was not put in proper order for smooth handling. Motivation may be weakened, interest lost, and attention scattered because too much time is used in getting materials properly distributed. Therefore — *make sure that all materials are on hand in order so that confusion will be avoided.*

BEGIN ON TIME AND QUIT ON TIME.

Few things are more detrimental to a good conference than failure to start on time. A conference started late is seldom more than 75 per cent effective. A late start means confusion of thought, an unfavorable attitude, and a waste of valuable time. A meeting started on time breeds confidence and stimulates a definite business atmosphere.

By the same token, a conference that runs overtime breaks confidence and becomes a definite handicap for the next meeting. *Start the meeting on time and stop it on time.* It is much better to finish before the scheduled time than later. This prepares the way for future meetings.

MAKE MEETING PLANS IN ADVANCE.

A well-planned conference is generally a successful one. However, planning should consider such items as: (1) just what is to be accomplished, (2) an estimate of the time necessary to do the work, (3) the number of participants involved and their disposition to talk, and (4) the equipment and materials to be used.

Determining the objectives or purposes of a conference is one of the most essential phases of conference leading. Even though the purpose is to be drawn out of the thinking of the group the wise leader will think it out in advance. Although group thinking may change the purpose somewhat, it will generally remain basically near the same. This practice makes it easier to hold to the point and get the proper statement of aims in less time.

Careful estimation of the time required for a conference is of great importance. Proper timing can be learned only through practice and supervised practice will be of great help. If the time cannot be estimated it is wise to set a definite starting time and leave the closing time open. It would seem like poor planning if one hour were set for the conference and only twenty minutes used, or if one hour were set and two hours were consumed. Experienced conference leaders can, by manipulation, govern the amount of time to be used. Short cuts may be used when necessary or perhaps the time should be extended by careful questioning which will prolong the discussion and yet not get too far afield.

PREPARE KEY PEOPLE IN ADVANCE.

Sometimes it is wise to prepare some individuals in advance to participate in the discussion. In such an event a rehearsal with a small group of selected individuals would prove helpful. There should be no intention to do *log rolling* but rather to make sure that various essential facts are presented, facts which might not otherwise come to light. Even though the conference leader might state such facts, more force is given to them when presented by members of the group. The conference leader must at all times avoid being opinionated since such an attitude will more than likely defeat the purpose of the conference.

Key people are needed only when the conference problem is complicated, when some phases must be studied, or when time is too short to "worm out" the necessary facts. Care should be taken to use these key people in case of necessity. However, such individuals should not refrain from participation normally simply because they are prepared for an emergency. If they do not participate naturally and normally suspicion will develop and tend to defeat the purpose of the conference.

SOME RULES TO BE FOLLOWED IN CONFERENCES.

A few simple rules should govern all conferences and these should be made more or less habitual in such groups. These rules are:

1. The leader or some keyman should present the problem in its natural setting or background.
2. The leader should start the discussion with only a few comments and questions.
3. The leader should participate on the same basis as other members when the discussion gets under way.
4. Conferees should talk to the group and not the leader.
5. All should be given an opportunity to participate in the discussion.
6. The leader must maintain control of the meeting at all times but not too obviously.
7. Members must learn to talk one at a time.
8. Opinions and feelings are very important when dealing with human problems.

PLANNING THE MEETING'S PROGRESS.

Define or get a definition of the problem. Although the leader may have the problem defined in his notes, it is well to let the group work out a definition in their own words because it becomes their problem when that is done. It is generally possible to get the group's definition to correspond to one formulated by the leader. If it is important — work a little longer and it can be worded as one desires. Sometimes it is desirable to define the problem, then get the group to accept the definition. This may save a great deal of time. It should be remembered, however, that it is not their problem until they have accepted it.

DETERMINE THE AIM.

It is often difficult to distinguish the aim or purpose from the problem. For instance, the problem may be, "How can we get women mechanics accepted in our plant?" The aim in this instance may be "to get women mechanics accepted in the plant without upsetting the group of workers." In other words, it is just another method of stating the problem, but it does tend to make it more specific and more practical.

OUTLINE THE OPENING REMARKS.

Some leaders find it desirable to write the entire introduction because they are not accustomed to talking from notes or an outline. If the introduction is written, it has the advantage of being more to the point and better worded. The greatest disadvantage of the written introduction is that it appears too formal and makes it more difficult to use the immediate inspiration of the particular group. It takes time and practice to learn to talk from an outline, but it will pay dividends in the long run.

Determine in advance what motives to use. Any conference, to be successful, must be motivated, and it is usually up to the leader to study the possible motives for use in a given situation. A list of the motives which are common to most groups will be helpful in selecting the ones which might be more effective in a given situation or on a given problem.

THE PRINCIPAL OR MOST USED MOTIVES OF MEN ARE:

1. Desire for financial gain
2. Increased comfort
3. Health and safety
4. Honor or praise
5. Publicity
6. Good will or standing
7. Prestige within a community or within a certain group
8. Ambition for advancement collectively and pride in quantity or quality of a product
9. Ease in work or efficiency
10. Saving of time or energy
11. Competition with others in the class of business
12. Departmental rank

The desire for financial gain will normally motivate 95 to 100 per cent of the working population. It is therefore one of the strongest motives to use. If the problem involves this item, it will have motivation without much difficulty.

Most individuals desire comfort. This motive may involve dress, lighting, ventilation, heating, cooling, better equipment or tools, and other working conditions. This motive can be used in a great many problem conferences.

A survey of motives which drive individuals puts health near the top of the list. In this event health and safety appeals are strong and may swing a conference toward the proper solution of a given problem.

Most people respond to anything which may bring honor or praise to the institution, department, or group. If there is anything in the problem situation which may lead to honor or praise, this motive may be used to advantage for the creation of interest in the discussion as well as the solution of the problem itself.

Publicity is sought by the great majority of people. It will serve to motivate a group working on a problem in which this may be a part. Both individual and group publicity will motivate most conference groups. The leader should know just how much appeal should be made to utilize this powerful motive.

Although individuals will not be greatly motivated by the desire for good will, it does serve effectively in a group. Management strives for it, and is definitely motivated by the possibility of achieving good will. In most cases it will motivate a conference in which "good will" may play a part.

Prestige is sought by individuals as well as groups and institutions. If it can be shown that some prestige might be gained by the proper solution of a problem, the group will be motivated and will participate more wholeheartedly in the meeting.

Ambition has been the dominant motive used by most conference leaders as well as institutions. However, care should be exercised in the use of ambition as a motive, because it is not general but specific. An individual's ambition may be to earn more money, but back of that is a specific aim. Why does he want more money? Ambition may be utilized in a general sense, such as ambition to get money, win fame, get a higher ranking position, etc. Nevertheless, we should remember that there are ten separate ambitions, all of which may be different, represented in a conference with ten members attending.

Pride may be used in about the same manner as ambition. Pride is also specific. One is not driven to action by general pride, but rather pride in something more specific, such as one's job, one's product, one's dress, etc. One may develop a certain institutional pride which may be used as a motivating force — provided a large enough number of the group have had time to develop an institutional pride. This is usually classed as loyalty to the group or institution.

All are interested in making their work easier, or efficient, which means about the same thing. If an appeal can be made on the basis of making the work easier, one can expect co-operation of the group on the problem and its solution.

Saving time and energy is in the final analysis, making an appeal to the same motive as ease of work. These are two phases of the same thing.

Competition and rivalry are often used to motivate a group. These motives are strong and can be used to greater advantage in getting output and quality than motivating a meeting.

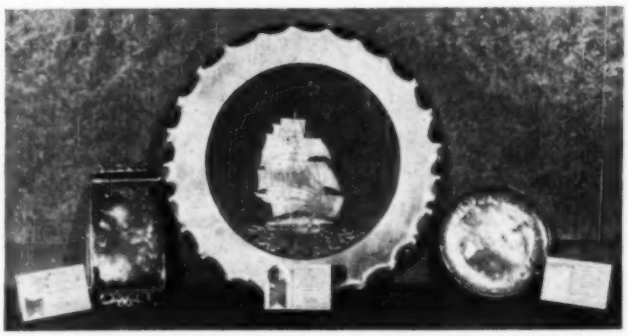
It should be understood that all these motives cannot be used in any one conference, since it would make for confusion, but three or four may be used to great advantage. Making the most of three or four natural motives is much more effective than making a little use of too many motives. Therefore, select with care the motive which will work to best advantage in handling the problem or situation at hand.

In summary, it might well be said that an effective conference depends in a large measure upon ***setting the stage.***

SETTING THE STAGE IS ACCOMPLISHED BY:

1. Getting the meeting place in order.
2. Having equipment ready and at hand.
3. Having material ready and in place.
4. Beginning the meeting on time, and quitting on time.
5. Planning the meeting in advance.
6. Preparing key people for difficult problems.
7. Following some simple rules.
8. Planning the meeting and motivating it.

(To be continued)



Industrial-arts exhibit. See article on page 237. Submitted by James O. Reynolds, instructor of general metals, McKinley Occupational School, Dayton, Ohio

— Photograph by John Thomas Newell, Chicago, Ill.

The Industrial-Arts Exhibit

JAMES O. REYNOLDS
Instructor of General Metals
McKinley Occupational School
Dayton, Ohio

The second annual industrial-arts awards fair was in progress last year at the Chicago Museum of Science and Industry, August 23 to October 15. To have an exhibit in this building is in itself an achievement since only top-notch exhibits are permitted floor space, although many are of a permanent nature. The industrial-arts exhibit was extremely well planned and arranged to show off each individual project to the best advantage. The different divisions of competition were carefully spaced to avoid confusion while viewing the display. Each display was well lighted and identification cards on each project could be easily read by the observer.

Most industrial-arts teachers are familiar with the rules of this contest. It offers a fine opportunity to industrial arts to sell itself to the public. Too many school shops hide their light under a bushel. To participate in such an exhibit requires that a high standard of work be performed. The rules booklet explains very specifically that exhibited projects be of high quality. This fact coupled with a desire to enter the contest may motivate many instructors to encourage their students to enter.

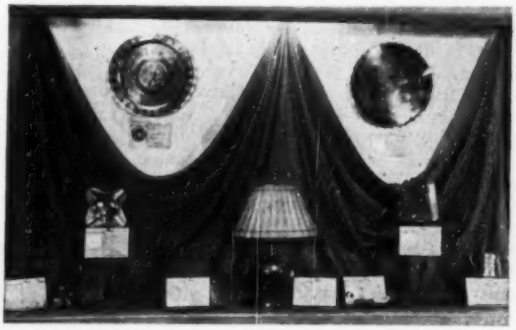
The exhibit feature, whether it be national or local in scope, always causes a very strong student interest. Competition is a natural part of human nature, so if one student sees the work of another on display, he, in turn, will want to participate. In order to accomplish this, his work must be of similiar or superior quality. If someone in the competing group becomes a prize winner, the enthusiasm to enter increases immensely. As the desire develops to do a job well, the need for restrictive discipline decreases and teacher and student is much happier.

As a training aid the permanent type exhibit serves a very definite purpose in helping students choose their projects. As a picture is worth a thousand words, so is a model worth many pictures. The instructor must expect to have students with little imagination, so to help them along with a motivating factor such as a permanent exhibit, it becomes a social asset as well as a technical one.

Again as in selling a product, the public judges the project in the final analysis. Let the school patronage help choose your entries for the state or national contest by having local exhibits, using discretion as to how many and of which types. Cooperation of other school officials should be sought to insure the success of the enterprise.

Sometimes the instructor may be biased or, better phrased, cannot see the project in the same light as a group of people. A prize winning entry should have eye appeal as well as good technical execution.

To engage in such a public exhibition is like the proverbial shot in the arm to industrial-arts people. It not only serves as a wonderful motivating factor in shopwork for the students, but it also becomes a goal for shop teachers to accomplish something new and different. It is quite a thrill to have a prize winner in such a highly competitive exhibit as the industrial-arts awards fair now held annually at Chicago, Ill.



— Photographs by John Thomas Newell, Chicago, Ill.

REMEMBRANCE — DECORATION DAY

Remembrance of our dead returns
To us today.
Time brings them nearer once again
From far away.

Their forms and gestures resurrect
From memory's grip;
We feel the vanished hand in ours,
Or touch of lip.

Though spirits of the dead remain
Unseen, unheard,
Their valiant deeds are living still
In work or word.

We, living, tread the ground today
Which once they trod;
Tomorrow may we be as they,
At peace with God.

— *Lindley H. Bennett,*
Toronto, Ontario, Canada.

Upgrading Vocational Teachers

THOMAS DIAMOND
University of Michigan
Ann Arbor, Mich.

(Continued from page 193 of the May, 1949, issue)

Encourage Teachers to Attend Professional Conventions

There are those who look upon conventions as a waste of time and money and who, when they do attend, get little out of them. In this group may be found young men who are not yet aware of the values to be obtained from attending. Then too, there are some more mature people who have not yet learned that meetings of this nature can aid in advancing an individual professionally.

When one attends a convention he has opportunities to meet and visit with others engaged in the same or in related work. He finds that he and they have common problems which they can discuss to their mutual advantage.

He finds it possible to meet personally the leaders in his field and to gain from them the results of their greater experiences. The people whose names are merely names in magazines or in books become personalities one can see, talk with, and remember.

The fact that one makes these contacts tends to develop a feeling of belonging to a worth-while organization, and is likely to send the person back to school with the feeling that he is playing a part in a movement that stretches far beyond the limits of his local community.

Then too, he can discuss his problems with others with similar interests and benefit from their experience.

As a rule, the teacher who attends a convention has an opportunity to examine the latest texts and teaching materials in his field. This enables him to keep abreast of the changes going on all over the country.

The convention enables the teacher to become acquainted with the leaders in his field, both nationally and in his state. As a result, he gets to be known nationally and may have opportunities to serve in some capacity away from his local environment.

The result of all this is that the teacher returns to his school inspired to greater effort, and with new ideas designed to increase his efficiency as a teacher. He conveys to his fellow teachers some of his enthusiasm and this tends to uplift his whole department. The director benefits from this since any improvement in the department, or in the morale of his teachers, is reflected in the attitude of the administration toward the department as a whole.

All this suggests that the director should actively encourage his teachers to attend conventions. This can be done by a rearrangement of class schedules to permit attendance, and, when the budget permits, it may include a certain allowance toward the necessary expenses.

When it can be arranged, it is a worthwhile experience for the teacher to take part in the program at the convention. Frequently, a director has opportunities to make suggestions to the program committees, and, if one of his teachers has developed something of general interest to other teachers, he should make an effort to have the teacher placed on the program.

Assist Teachers in the Use of Visual Aids

Most teachers recognize the value of visual aids, but only a small percentage of them use them as extensively as they might. The director is in a position to increase the use of visual aids, and to make them more effective if he actively promotes this method of instruction.

In many cases teachers would use visual aids if they were familiar with the manipulation of the various types of projectors. In view of this the director might provide opportunities for the teachers to become familiar with these projectors and to get some practice in using them.

Then too, the director might make a practice of bringing to the attention of each teacher slides or films relating to the teacher's special field. In addition, he should make them available at the time the teachers can use them most conveniently.

The director should encourage the development of visual aids in the various departments. When a new device is prepared by a teacher, it should be brought to the attention of other teachers who might use it. This may have the effect of stimulating other teachers into developing other aids.

Provide the Best Working Conditions Consistent With the Available Budget

The efficiency of any working group depends to a considerable extent on its morale. And one's morale is affected directly by the conditions under which he is called upon to work. In view of this, it is to the advantage of a director, as well as to the department he represents, if he extends himself to obtain for his teachers the best working conditions available.

The director must be ever on the alert to see that classrooms are well heated and well lighted. He must avoid waiting until a teacher complains about conditions. He should be ahead of the teacher on his thinking and should take the initiative in correcting situations that he considers undesirable.

It is recognized that it is not always possible to obtain new equipment. However, it should be the responsibility of the director to see to it that the equipment with which the teachers must work is as nearly up-to-date as his budget will permit. Here again, the teacher should be in a position to take pride in the equipment he has in his shop. If he has reason to be proud of it, he is likely to be happy and, when he is happy, he is a better teacher.

When new equipment cannot be obtained, there still remains the task of keeping in good working order the equipment the teacher already has in his classroom. The director can do much to help the teacher solve this problem by his interest and encouragement as well as by providing such materials or parts as the situation demands.

There is a tendency in some cases to locate vocational classes in the less desirable parts of the school building. Because of this we find some school shops located in dark, dingy basements. This tends to develop an inferiority complex in the minds of the teachers which is reflected in the attitude of the pupils attending their classes. This is a matter with which the director must concern himself to the end that the allotment of space for shops in a school building is made with the same consideration for light and fresh air as is given when other subjects are being assigned to rooms. This attitude can be achieved only when those responsible for room assignment are convinced that vocational classes constitute an important part of the school program. The director can do much to help develop this attitude on the part of his associates.

The question of how many pupils should be in a class is a debatable one. However, there is a point beyond which the class size cannot be increased without impairing its efficiency. Where this point is, depends

upon conditions. The director should know where this point is in each case and should take an active part in protecting the teacher from the efforts of others to unload on him more pupils than there are work stations to accommodate them.

In some schools the shop teacher is expected to act as the utility man for the building. He builds bookcases, he prepares equipment for the athletic department or scenery for the school plays, he fixes electrical equipment, and does such other jobs as the principal sees fit to assign him. When this situation exists the teacher must devote time to these tasks which should be used for teaching. Furthermore, it tends to reduce the position of shop teacher to a position which is not in keeping with his legitimate professional standing.

Here again, the director must take a stand and protect the teacher from exploitation by principals or department heads who too frequently ignore the fact that the function of a teacher is to teach.

Then there is the question of salary. If the teacher is expected to have a real professional spirit, and if he is to take pride in his work, the director must obtain for him as much salary as the policies of the school system will permit. If the director can create in the minds of his staff the conviction that he keeps them in line with the prevailing salary schedule, he will have done much to create among them a good professional spirit.

Then too, the teacher becomes disgruntled when his supplies are not available when they are needed. In some cases this condition may be the result of his own negligence. However, on all occasions the director should feel that it is his responsibility to see that the teacher is not inconvenienced because of a lack of material. This is closely related to the smoothness with which classes operate which definitely affects the efficiency of the teaching done.

The Director Should Keep His Promises

The teacher does a better job of teaching when he has confidence in his superior. The director who has the reputation of being reliable can reasonably expect to have a co-operative group of teachers. When he promises to do something the teacher knows that the matter will be attended to with the result that the teacher proceeds with confidence and, as a result, he is a better teacher.

On the other hand, if he loses confidence in his chief, or if the chief is constantly presenting alibis, he tends to develop a "don't care" attitude which definitely affects his work.

Don't be afraid to say, "No" when it should be said, but don't blame the superintendent.

Build Morale

The efficiency of any group depends to a large extent on their morale. If the members of the group are happy in their work, and if they are proud to belong to their organization, both the quality and the quantity of their product are good. On the other hand, if they are dissatisfied and if they have a feeling that their associates are not high grade, their attitude toward their work is poor and the whole organization suffers.

Because of this it is important that the administrator concern himself with the problem of building up a feeling in his staff that they are leaders in their field, that their department is the best, and that their fellow workers are respected in their school and in their community.

The administrator can do this in a number of ways. By being fair minded, and by building up a reputation for being a man of his word, he can develop the feeling in his teachers that he is an excellent administrator, and one for whom they want to work.

He can create a feeling of friendliness among his teachers by encouraging departmental social activities. Bowling, golf, or occasional parties all contribute toward the development of a group spirit. All of these activities cause the teachers to develop a feeling of belonging to the group and generally makes for the building up of a better esprit de corps.

If these are continued the teachers will acquire respect for their fellows and are likely to gain confidence in their leader.

Encourage Initiative

Occasionally teachers show evidence of having initiative in developing new methods of teaching, preparing teaching aids, arranging or rearranging equipment, for evolving effective class organization. This quality should be encouraged in every way possible. The director should make provision for experimentation in all phases of the work, and should take an active interest in any results that may ensue.

When a teacher develops an idea to the point that it may be of value to others he should be given an opportunity to present it to his fellow teachers in order that they may benefit from it, and in order that the originator of the idea may profit from the criticism and suggestions of his associates.

Then too, the matter should be brought to the attention of the principal of the school in which the teacher is located since he will be happy to learn that one of his teachers has shown originality in his teaching.

It is tremendously important that the director lean backwards in giving the teacher full credit for his ideas. It is so easy to take such matters for granted and thus discourage the individual concerned.

The reputation of the director depends largely upon the reputation of the teachers. If the teachers in a department become recognized because of their originality and initiative, the standing of the department in the school system is improved. When this occurs the director shares the reflected glory.

(To be continued)

SELECTED SERVICE

("From each according to his ability; to everyone according to his need.")

Blest is the man who has found his work
And loves what he has to do.
Blest is the man who knows his work
And yet learns what is new.
Blest is the man who can live his life
For himself and others too.

Environment and heredity
Direct life at its start;
Educational training
Prepares man for his part;
Vocational choice, if wisely made,
Gives scope for mind and heart.

Body and mind in all mankind
Are varied in high degree.
Environment differs for everyone,
And effects of heredity.
Work that is play for one may be
For another one, slavery.

That a youth may know which way to go
For work he is fit to try,
We test his mental and physical power,
We test his hand and eye;
We give him trial experience
In work that may signify.

We list the jobs that should be done
And analyze their need.
We list the qualities required
In workers to succeed.
We place the men who have the gifts
In jobs to suit their breed.

Each man to the work he can do the best
And joy from the labor glean.
A man may work by the sweat of his brow,
Or the sweat of his brain — unseen —
But no man's work should break his heart
Or make of him a machine.

— *Lindley H. Bennett,*
Toronto, Ontario, Canada.

Mr. McNamee Retires

The recent retirement of Philip L. McNamee as assistant superintendent in charge of vocational education for the Chicago public schools, removes from active service a pioneer who did much to develop early plans for the organization of vocational schools as a part of a great city school system. His professional preparation and his step-by-step rise from the school shop to a supervisor's office, and to the top administrative position, was typical of many of the men who have given the vocational schools their sound practical character, and have raised them to the high respect which they now enjoy from leaders in education, from industry, and from labor.

Mr. McNamee served the Chicago schools 32 years. Beginning as an elementary school teacher of printing, he was advanced to a high school and then to the Washburne Trades School. In 1927 he was made industrial co-ordinator whereupon he began to expand the apprentice training program. He obtained his college education during spare time.

The progress of vocational education in the Chicago schools is associated by Mr. McNamee with beginnings in the old Washburne Continuation School, and his later progress in the school's new location.

Lecture demonstration in front of hangar at the Chicago Vocational School on propeller inspection and maintenance by Mr. C. W. Peffer, aircraft engine mechanical instructor

In 1939, when the need for national defense arose, the United States Office of Education found the Chicago schools ready. Within one week of notification, Chicago had three technical high schools training defense workers in day and evening classes. Eventually all the vocational and technical schools were operating as defense training units, and after Pearl Harbor the tempo was accelerated in some schools to 24 hours a day.

Coincidental with the expanded program, Mr. McNamee was appointed to the newly created position of assistant superintendent in charge of vocational education. He also assumed the directorship of the school program for war production training. He helped to organize the Navy Pier as a training station for enlisted personnel. Several large school buildings were occupied by the Army Signal Corps, and the new Chicago Vocational School was absorbed by the navy.

Toward the close of the war the veterans education program became operative under Mr. McNamee. Special centers were established for veterans who desired to complete their high school education. Veterans who desired refresher courses and training courses for new jobs and trades were accommodated in day and evening schools, at elementary, secondary, and junior college levels.

After V–E and V–J days the continuing need for practical training prompted the opening of additional vocational schools in Chicago so that the city now has seven schools devoted to vocational, trade, and commercial instruction at the high school level. Four of these schools have evening adult classes. The vocational department has supervision finally of the shop and drafting classes in the regular high schools.

Dr. Herold C. Hunt, general superintendent of schools, is shown what is done in the vocational classes for girls

Line service and maintenance phase of aviation mechanics training; aircraft are tied down in front of hangar at the Chicago Vocational School

With the co-operation of unions and trade associations Mr. McNamee has been influential in having approximately a million dollars worth of equipment donated to the vocational and trade schools by manufacturers and dealers. This has enabled the board of education to extend the vocational program in the schools. Thousands of dollars worth of government surplus materials have been secured also for the school shops.

More important than the acquisition of valuable equipment and materials, has been the expansion of the vocational courses under Mr. McNamee. Much of this expansion has followed the demands of trade associations and labor organizations for special courses in new fields. Thus, in 1947 approval was granted by the Civil Aeronautics Administration for certificating the vocational department to establish an aviation training program in three vocational schools. Courses are centered around aircraft mechanics training and aircraft engine mechanics training.

When the navy operated the Chicago Vocational School during the war a hangar was built for the training program and the school was completely equipped for aviation. This hangar and equipment, through purchase at a nominal sum, remained after the school reverted to the board of education. There was sufficient material to equip the aviation departments at the Washburne and the Dunbar Trade schools. The program is supervised by a certificated former C.A.A. inspector who holds all required certificates and ratings issued by the Civil Aeronautics Administration.

At the request of the Chicago Council on Community Nursing a one-year course for training practical nurses was instituted during the past year. The course embodies 15 weeks of school training and 31 weeks' practice work in hospitals and public agencies.

A co-operative program in distributive education has been organized for training senior high school students for retail merchandising positions. These students devote half of the school day in the classroom and the other half on the job where experience is gained at prevailing wage rates. The instructor acts as supervisor for the individual work program. Mr. McNamee opened the vocational training ranks in retail selling to girls some years back, and all vocational schools now have offerings suitable to girls.

During the past ten years the Jones Commercial High School, located conveniently in the downtown business area where it may be attended by part-time employed students, has offered a concentrated program of vocational work for third- and fourth-year high school students. The work is open only to those students who desire to follow definite jobs in business offices. This program has received the commendation of business leaders and the Chicago Office Management Association, as well as commercial educators. During the war office personnel were trained for government service.

In 1948 interest in the offerings of one of the trade schools reached such a point that the International Harvester Company petitioned for evening school facilities so that its employees might receive class instructon in a variety of subjects. No public funds were available, so the corporation rented the school quarters and employed teachers to conduct the program for its employees.

In addition to the vocational and academic programs, the vocational schools offer a variety of extracurricular activities. Library facilities, music, art, and physical education are part of the program. Competition in league athletics is conducted and intramural teams are encouraged. Recently a trade student received second place in a national oratorical contest. Vocational school students continually are recipients of scholarships to schools of engineering and technology.

Young men employed in local shops of national chains attend part-time classes for training as meat cutters. The initial class of one school proved to be so effective that a class was organized in a second school in another part of the city.

The Chicago trade and vocational schools now enroll 7000 apprentices, 8286 unit trade students, 5131 continuation students in the various trades and occupations. In the evening trade and vocational schools a total of 7591 adults are carrying on class and shopwork. The directors of the vocational schools hold engineering degrees or have had practical trade training; without exception they are expert teachers in their respective fields. The vocational program is constantly under scrutiny to fit the needs of students preparing for the workaday world and to meet the demands of business and industry. Instructors have been recruited from the trades or selected for their specialty on the basis of successful performance. Tradesmen who enter the school system as teachers, work on temporary certificates until they have met the educational requirements for examination and promotion.

Mr. McNamee is now devoting part of his time to work as Director of Educational Research with the American School, Chicago.

VIKING SHIP BOOK ENDS

SIMON S. PALESTRANT
and
I. PLATNICK
Bronx, N. Y.

An excellent metal project that elicits quite a bit of student interest is this Viking ship converted to a book end. Sheet copper of No. 22 gauge, 1/8-in. brass r.h. rivets, 1/8-in brass round rod No. 8, and 1/8-in. nickel-plated washers are used.

BILL OF MATERIALS

No. of pcs.	Name	Material	Size
2	Book end	Copper	No. 22 x 5 x 6½ in.
2	Ship prow	Copper	No. 22 x 1½ x 8 in.
2	Sail	Copper	No. 22 x 3½ x 5½ in.
2	Pennant	Copper	No. 22 x ⅝ x 3 in.
2	Mast	Brass rod	No. 8 x 2 in.
2	Prow figurehead	Brass	1/32 x 1½ x 3 in.
16	Shield — Nickel-plated washers		No. 8 x ⅜-in. dia. with 1/8-in. hole
16	Brass rivets		1/8 x ¼ in.

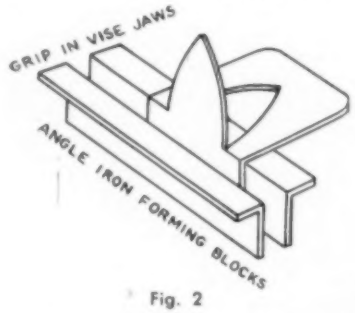


Fig. 2

Cut out the shape of the book ends as shown in Figure 1. Pierce the tongue piece from its center. Bend it over the edge of an angle iron so that the pierced tongue lays flat as does the back piece. These are at right angles to the upright of the book end. See Figure 2.

Now cut out the sail according to the pattern in Figure 3. File and smooth the edges with No. 2/0 emery cloth. Billow it over a T stake as shown in Figure 4.

Cut out the prow from a single section and bend it to fit the tongue piece exactly in its curvature. Before doing so, set the front six rivets so that the insides are flush with the metal. Solder this prow to the tongue and the upright from the inside to avoid any unsightly solder marks.

Place the upper end of the sail flat against the upright and prop it up with wires to hold it in place. See Figure 5. After it is securely soldered, bend the lower ends of the sail to touch the last rivets on either side of the prow.

The figurehead is traced with a scriber onto the metal, and cut out with a jeweler's saw. Needle file it to exact contour, and smooth it off with No. 2/0 emery cloth. Solder it in place at the head of the prow. The mast and pennant are cut and bent to their respective shapes and they, too, are soldered in place.

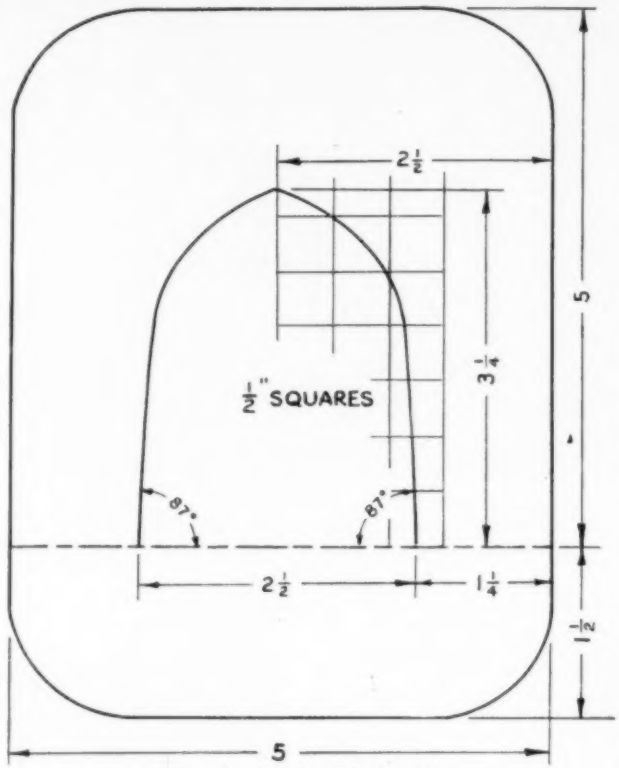


Fig. 1. Layout of book end

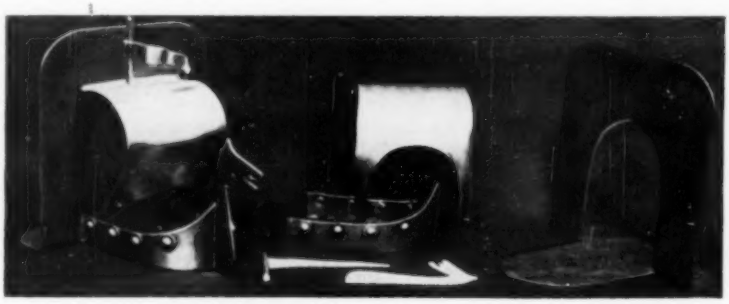


Fig. 4. The parts ready for assembly

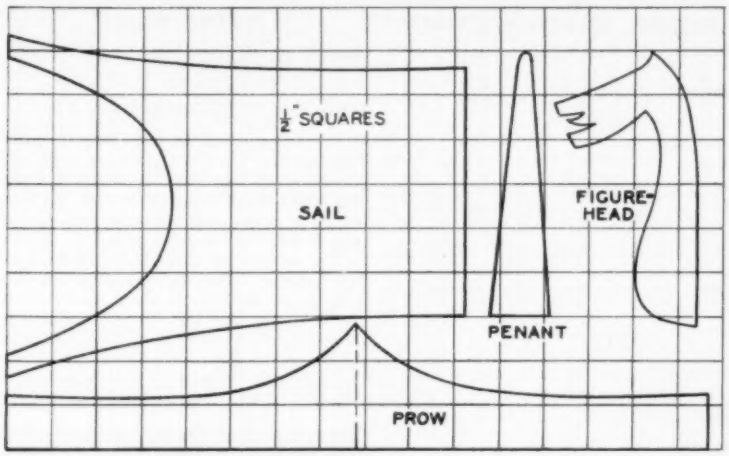


Fig. 3. Layout for sail, prow pennant, and figurehead

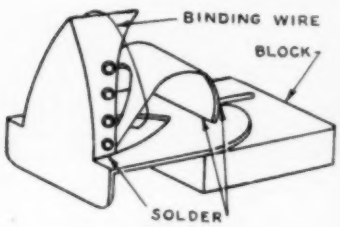


Fig. 5

It is suggested that the pennant and prow be peened so that there will be a textured contrast to the other parts. In either case, antique the crevices and depressions with liver of sulphur. High-light the job by rubbing it lightly with crocus cloth. Wipe dry and spray or brush a thin coat of lacquer to fix the finish.

Soldering order:

1. Ship prow to tongue
2. Sail to book end (upper end)
3. Sail lines to prow (lower end)
4. Masthead (wire in place before soldering)
5. Pennant and mast to book end

WELDING PROJECTS

H. W. HUMPHREY
Assistant Professor of Industrial Arts
Ohio University
Athens, Ohio

Shop instructors will agree that before attempting to do worth-while constructive jobs a certain amount of preliminary practice is necessary and this is especially true in welding. However, the student in welding who is required, day after day, to do nothing but practice the various types of welds on small pieces of metal is not going to be very much interested in his work and he will not strive for perfection nearly as hard as he will if permitted to design and complete a project which can be used after it is finished.

The accompanying illustrations show some of the projects completed by a recent beginning welding class after the students had some practice on the most common types of welds.

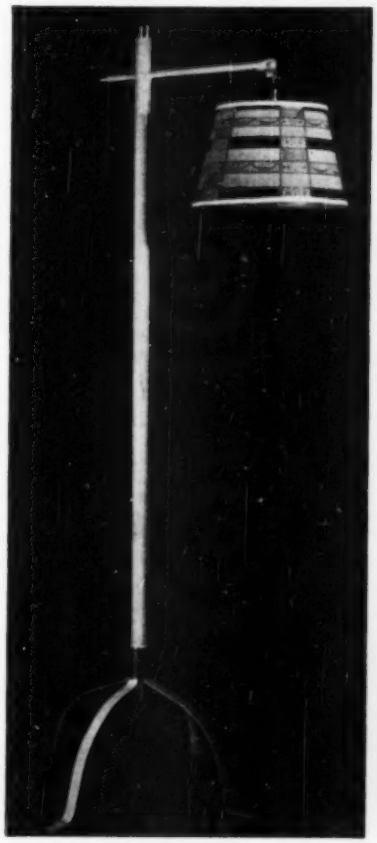


Fig. 1. Bridge lamp

Fig. 2. The kitchen stool with collapsed ladder

The bridge lamp, shown in Figure 1, illustrates an original idea in which two sizes of airplane tubing were utilized for the post and arm. Strap iron feet welded to the post, and the fixtures for the socket welded to the cross arm, two brass knobs and a brass band around the joints of the feet complete the project. The type of welding in this project requires certain knowledges and skills before it can be completed in a satisfactory manner.

In contrast to the small amount of welding in the lamp, the kitchen stool and step ladder shown in Figures 2 and 3 requires the welding of more than three dozen joints. This project is also constructed of airplane tubing which

Fig. 3. Kitchen stool with unfolded ladder

Fig. 4. Light garden wheelbarrow

makes it very light in weight. The leather seat, painting, and the mounting of the rubber mats on the steps are done by the student outside of class. Only the welding is done in class. The two views show the steps in both positions.

The wheelbarrow, in Figure 4, was designed as a lightweight flower garden type which may be handled easily by the woman gardener. The handles are made of 1-in. airplane tubing. The legs are ⅛ by 1-in. strap iron. The bed requires a piece of 16-gauge black sheet iron, 3 ft. square. The wheel may be obtained from the junk yard. The entire weight of the wheelbarrow is approximately 40 pounds.

The anvil, shown in Figure 5, is used to give students practice in using the cutting torch. The practice offered will challenge the student much more than just cutting up some metal. This project will be especially worth while if the student secures the rail and is allowed to keep the anvil. The face and sides of the anvil, in Figure 5, were machined on the shaper, and the horn was ground to shape. The contour of the base was cut with the torch and the rough edges ground off.

The students also made other projects which are not illustrated. The largest job was that of building a handwalker for a neighboring playground. In addition to the arc welding practice this afforded practice in layout, cutting, and assembly.

Outdoor tables, tool racks, broom holders, dustpans, clothesline props, and shop tables were some of the other projects completed. Several home repair jobs were brought in by students.

The welding area of a shop should co-operate with all other areas and yet it should never be thought of as a maintenance department. However, students will find that jobs received from other departments offer a greater diversity, and present situations to the learner such as the job welder finds in actual practice. These jobs offer a real challenge to the student and prompt him to put forth his best efforts.

Fig. 5. Anvil made out of a piece of rail

ELECTRIC SOLDERING-COPPER HOLDER

CLINTON R. HILLYARD
Howard Roosa School
Evansville, Ind.

This soldering-copper holder is a necessary piece of equipment to the soldering bench. It prevents many burns to the hands and is a safety precaution against fire. The illustration shown is for a right-handed person. For a left-handed person the drawing is reversed. It is very attractive and most noticeable when painted red. It fits on the wall.

One piece of 20-gauge steel 3 by 15½ in., is required. There will be enough cut away to make the soldering-copper holder. Paint or enamel is required.

Procedure

1. Cut the material 3 by 15½ in.
2. Lay out all the lines with a scriber.
3. Cut out with a sharp pair of shears.
4. Locate holes and punch with a 3/16-in. punch.
5. Fold or bend to shape.
6. Smooth all edges with a file.
7. Form copper holder and weld in place. Adjust to fit the copper.
8. Paint or enamel with some attractive color — preferably red.

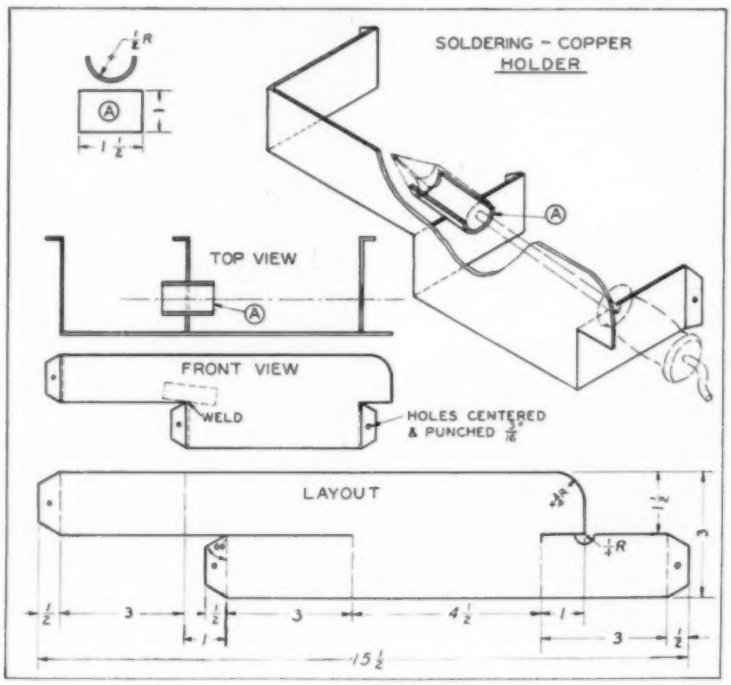
PLASTIC BOXES

PERCY W. BLANDFORD
Gibbons Secondary Modern School
Willesden, Middlesex, England

Catalin tubes can be made into attractive powder boxes, jam dishes, or pin trays, by turning and fitting with lids and bases. Combined with sheet Catalin or Plexiglas, the large range of colors and sizes make possible an almost unlimited range of designs.

This project provides an interesting turning exercise, within the capabilities of less experienced students, as all of the work can be done with one tool — a right-hand knife tool, ground with 5 to 10 deg. side and front clearance and negative top rake. A basic design gives the steps in construction, but the student can vary this to suit personal ideas.

Fig. 1. Plastic boxes



Soldering-copper holder

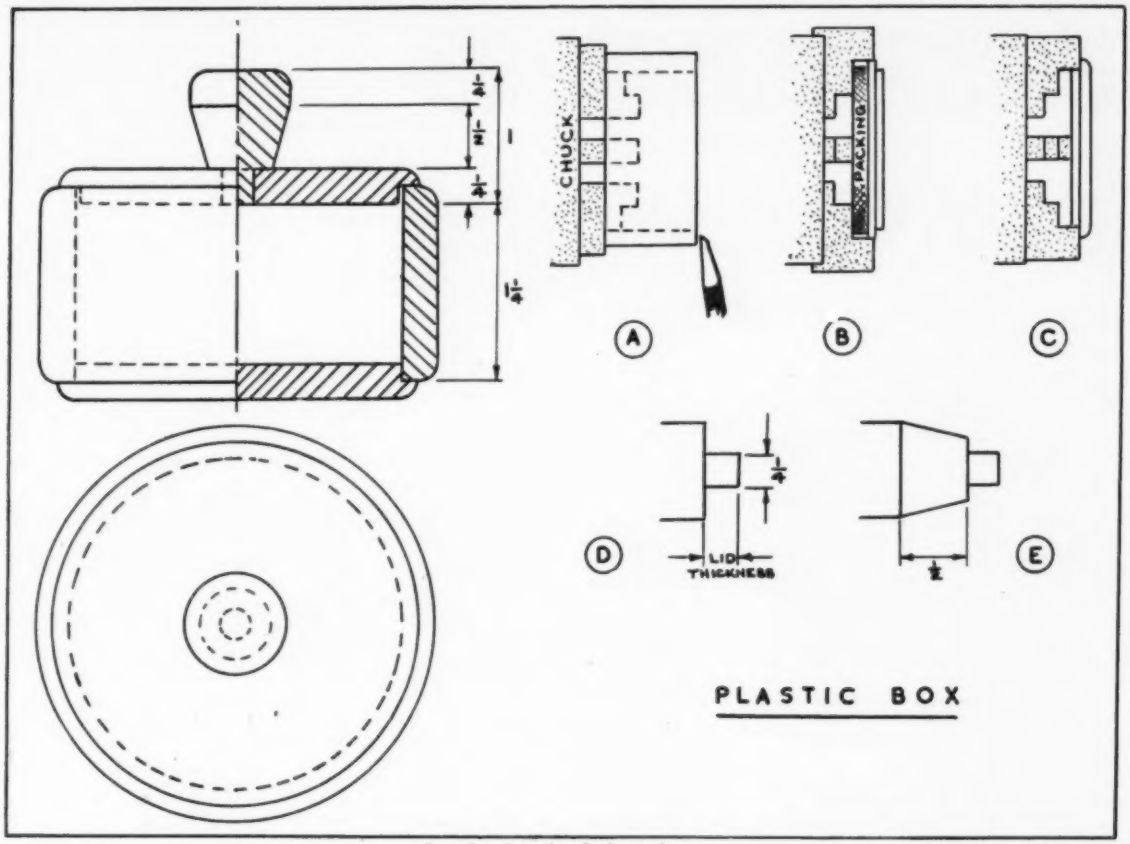


Fig. 2. Details of plastic box

The handle design offers considerable scope, and the large range of colors permits many combinations affording an opportunity for training in color sense.

Material for Basic Design

Catalin tube, either plain or fluted, about 3-in. outside diameter, with walls about ¼ in. thick.

Catalin or Plexiglas sheet, ¼ in. thick.

Catalin rod, ¾-in. diameter.

Procedure

1. Cut tube to the length desired, allowing ⅛ in. for turning.
2. Mount tube on chuck, and square off both ends, as shown at *A* in Figure 2. Round the outer edges with file and abrasive paper or cloth.
3. Cut disks for top and bottom, about the same diameter as the external size of the tube.
4. Mount each disk in turn in the chuck, using a packing to ensure sufficient projection; then work rebate as shown at *B* in Figure 2. The bottom rebate should be a tight fit in the tube, but the top rebate should be an easy fit.
5. Reverse the disks and turn their outer edges to size. Round the outer edges with file and abrasive paper or cloth, as shown at *C*, Figure 2.
6. Drill a ¼-in. hole in the center of the top.
7. Mount the rod in the chuck, square off one end, and turn the dowel to fit the hole in the lid. See *D* in Figure 2.
8. Set the slide rest to 15 deg., and turn the taper, as shown at *E* in Figure 2. Reverse the bar and square off other end to length. Round the edge with file and abrasive paper or cloth.
9. Polish all parts.
10. Cement bottom to tube and knob to lid.

SELECTED PROJECTS IN LEATHER CARVING

WELCOME E. WRIGHT
Assistant Professor, Department of Industrial Education
A. & M. College of Texas
College Station, Tex.

Leather carving is one of the most interesting and fascinating handcraft activities. There lies in this type of leatherwork a strong motivator of handcrafts, well adapted to either the junior or senior high school student. The student who has mastered the fundamental processes involved in surface tooling of leather will find little difficulty in achieving success in the art of leather carving.

The novice should select a simple project for his first job in leather carving. Several such articles are presented in this article. Further projects in leather carving, designed to offer the work in a logical manner, may be published in later articles. The ones described here are a bookmarker and a western belt.

Bookmarker

The bookmarker, shown in Figure 1, affords an opportunity for creative design; it also involves many operations which the beginning craftsman must master before more advanced work is undertaken.

If the following procedure is applied, the novice should accomplish a well-designed and interestingly executed project.

Procedure

A. *Design.* — The design for the first project in leather carving should have long sweeping curves rather than sharp and irregular

FIG. 1. BOOKMARKER

FIG. 2. WESTERN BELT

ones. This suggestion is made in view of the fact that sharp curves are very difficult for the novice to swivel knife. The design shown in Figure 3 should afford the student desirable practice in the use of the swivel knife before attempting more complicated patterns. Designs involving little background will prove very effective, interesting, and attractive. The design for this project may be of such a nature that it may be repeated, as a unit, to form the total design. The pattern should be sketched on a good grade of tracing paper.

B. *Preparing Leather for Tooling.*

1. Select and cut a 1 by 10-in. strip of 6-oz. leather, vegetable tanned, natural grain, unglazed "Russet."

2. Submerge the strap of leather in water for about thirty seconds.

3. Remove the leather from the water and wipe off the surplus water.

4. Wrap the project with heavy paper and allow it to set for 24 hours. This is called *casing the leather.* NOTE: If time will not permit this method of *casing leather* the following procedure may be used, although the results will not be as satisfactory. After submerging the leather in water, place it on a clean flat surface and allow it to dry for about 30 minutes to an hour. The length of the drying period will depend upon the climatic conditions. Do not attempt to trace a design, or tool sloppy wet leather.

C. *Transferring the Design.*

1. Clip the pattern to the smooth or grain surface of the leather with paper clips.

2. Place the leather on a smooth hard surface such as plate glass or marble and trace the design lines firmly with a modeling tracer or a blunt pointed ice pick.

3. Remove the pattern and mark the lines deeper into the leather with the modeling tool.

D. *Tooling the Design:*

1. Place the project on a very smooth and hard surface such as a marble slab, with the flesh side down.

2. Set a pair of dividers equal to the width of the border and proceed to cut the border line with the sharpened point of the dividers, using the second leg as a gauge.

3. Place a 3/16-in. cutter in the swivel knife and proceed to carve the design. The success of the finished product depends upon the exactness of this operation. The cut should be well through the surface of the leather, and to a depth of approximately half the thickness of the leather. If the direction of the cut is made toward the worker and the incising done by the tip of the tool, the student will be able to follow the lines more accurately.

4. Use a beveling tool and an 8-oz. soft face hammer and bevel all curved lines on the outside of the curve. The tool should be struck with strokes of even and regular weight. NOTE: Considerable study should be given to the design before beveling the curved lines within the floral outline to make sure that the proper flower, stem, or leaf is brought to the surface or overlapped.

5. Select an oval depression tool and form sufficient impressions in the leather to give relief to the plain surfaces. If deep rich coloring is not obtained in this process, the leather may be too dry. If this is true, then more moisture should be added to the face surface of the leather with a dampened sponge. NOTE: Do not attempt to tool leather that is too damp. Wait until the surface color of the leather appears uniform and clean. If the leather is tooled while too wet, it has a tendency to return to its natural state when it dries.

6. Additional ornamentation may be applied with horseshoe or scallop shaped tools as shown in Figures 1 and 2.

7. The background area should now be depressed with a six dot line tool or a round pebble dot tool. Care should be exercised not to allow the tool to overlap or restrike the background.

8. Remove the sharp edges of the leather strip, both top and bottom, with an edge tool.

9. Shape the edges with an edge creaser of the appropriate size or stamp a design with a scallop-shaped tool as indicated in Figures 1 and 2.

10. The entire floral design should be touched up with a modeling tool by rounding and molding the floral design and smoothly burnishing the lines.

11. Clean with 10 per cent solution of oxalic acid crystals in water.

12. Burnish edges and back of the project with "burnishing ink" or liquid shoe polish.

13. Finish bookmarker with leather lacquer.

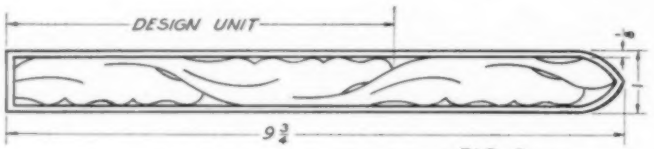


FIG. 3

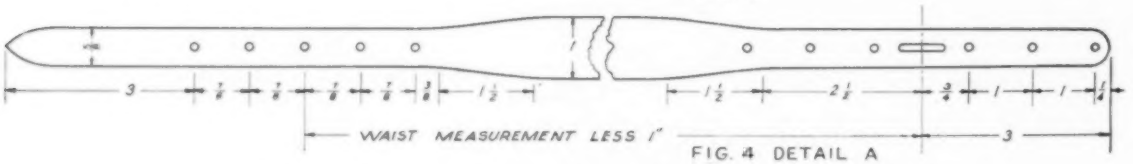


FIG. 4 DETAIL A

TEMPLATE FIG. 4 DETAIL B

Western Belt

The second project in leather carving, shown in Figure 2, is especially appealing to boys. Not only does it stimulate and hold interest, but it also involves some new operations and offers further practice to those presented in the bookmarker.

Procedure:

A. *Design.* — The design for this project may be the same as for the bookmarker or the student may desire to create a new one. The results will be far more satisfying and the boy will produce a belt that he will be proud of if he is encouraged to use a design he has had some past experience with. He should try to master a simple design before he attempts others. The design should be drawn on a good grade of tracing paper to form a template as shown at *B* in Figure 4. A full length template is not necessary.

B. *Preparing Leather for Tooling.*

1. Select and cut a strip of 8-oz. strap leather, vegetable tanned, natural grain, unglazed "Russet," 1 in. wide by waist measurement plus 8 in. long.

2. Lay out belt as shown at *A* in Figure 4. NOTE: Do not use a pencil on the leather, because it is difficult if not impossible to remove the pencil lead from the leather. Do all layout work on the grain surface of the leather with a modeling tool, but do not make the lines deep.

3. Use a straightedge and a leather knife and cut out leather on the outline.

4. Submerge the strap of leather in water for about thirty seconds.

5. Remove the leather from the water and wipe off the surplus water.

6. Roll up the leather and wrap with heavy paper and allow it to set for 24 hours.

C. *Transferring the Design.*

1. Clip the template to the smooth or grain surface of the leather with paper clips. Place the template as far down into the tapered portion of the tip end of the belt as the design will allow.

2. Place the leather on a smooth hard surface such as plate glass or marble, and trace the design lines firmly with a modeling tracer or a blunt ice pick.

3. Remove the template and relocate it at the point where the first unit of the template ended.

4. Trace the design lines firmly with a modeling tracer as in operation 2.

5. Repeat operations 3 and 4 until the tapered portion of the buckle end of the belt has been reached.

6. Mark all of the design lines deeper into the leather with the modeling tool.

D. *Tooling the Design.*

1. Place the project on a very smooth and hard surface such as a marble slab, with the flesh side down.

2. Set a pair of dividers equal to the width of the border and proceed to cut the border lines with the sharpened point of the dividers using the second leg as a gauge.

3. Place a 3/16-in. cutter in the swivel knife and proceed to carve the design. The direction of the cut should be toward the work and the depth of the cut should be approximately halfway through.

4. Use a beveling tool and an 8-oz. soft face hammer, and bevel all curved lines on the outside of the curve.

5. Select an oval depression tool and form sufficient impressions in the leather to give relief to the plain surfaces. If deep rich coloring is not obtained in this process, the leather may be too dry. If this is true, then more moisture should be added to the face surface of the leather with a dampened sponge.

6. Additional ornamentation may be applied with horseshoe or scallop shaped tools as shown in Figure 2.

7. The background area should now be depressed with a six dot line tool or a round pebble dot tool. Care should be exercised not to allow the tool to overlap or restrike the background.

8. Remove the sharp edges of the leather strip, both top and bottom, with an edge tool.

9. Shape the edges with an edge creaser of the appropriate size, or stamp a design with a scallop-shaped tool as indicated in Figure 2.

10. The entire floral design should be touched up with a modeling tool by rounding and molding the floral design and smoothly burnishing the lines.

11. Locate the point for cutting slit for buckle.

12. Cut slit with a ¾-in. oblong punch, or punch a series of No. 3 holes.

13. Mark location for snap button assembly as shown at *A* in Figure 4.

14. Place buckle in proper position and form the leather around the buckle.

15. Line punch No. 2 holes through the two thicknesses of leather at points located in operation 13.

16. Remove the buckle and assemble the snap buttons.

17. Clean the project with 10 per cent solution of oxalic acid crystals in water.

18. Burnish the edges of the belt with *burnishing ink* or liquid shoe polish.

19. Finish the project with leather lacquer.

20. Fasten the buckle and keepers in place on the belt.

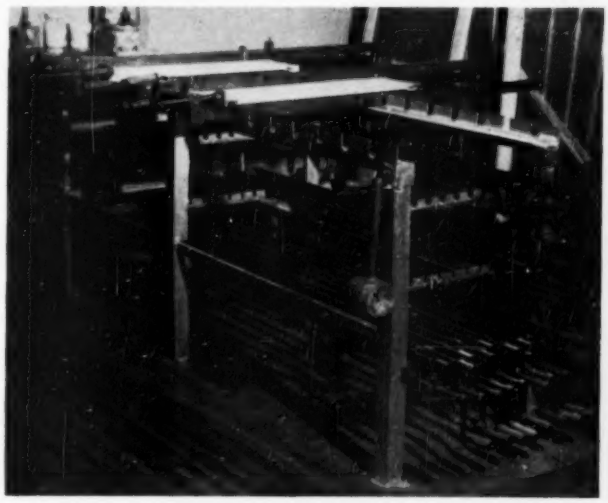
21. Check location of holes for proper waist adjustment and punch holes.

22. Attach belt tip.

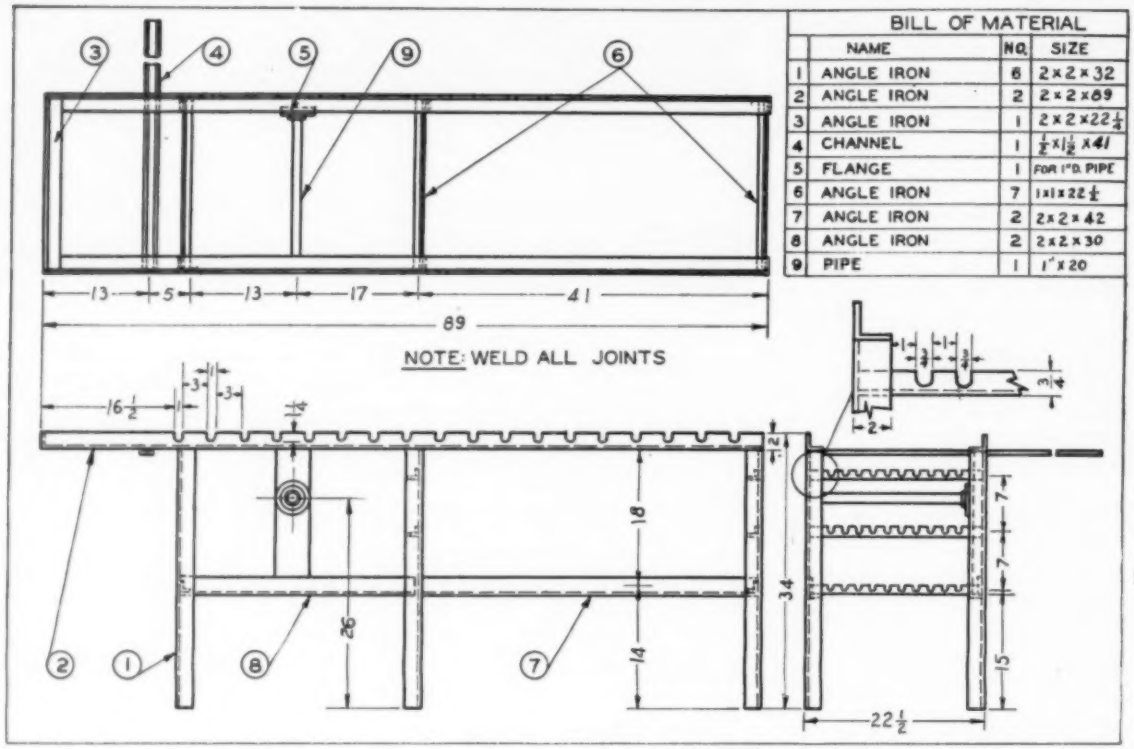
LITHIUM

Lithium is the lightest of all metals with a density of .019 pounds per cubic inch — less than one third the weight of magnesium. It is very abundant and found in more than forty minerals on the earth's surface. In the pure state it is a white, soft element which can be cut with a knife. It tarnishes quickly in air and in moist atmosphere combines violently with nitrogen. The pure metal, therefore, must be kept submerged in water-free kerosene. Lithium is added to aluminum, copper, lead, and zinc base alloys in very small percentages as a grain refiner, to increase hardness, strength, and resistance to corrosion. It is also used for deoxidizing and desulfurizing steel and to refine the grain structure and increase the density of cast iron. — *Belmont — Metal of the Month.*

There isn't much in the best of education today that the best of yesterday's teachers didn't do, only there are more best teachers today. — *From Teaching Progress, Milwaukee Public Schools.*



Assembly of glue table and clamp rack by Louis Barocci, High School, Cudahy, Wis. See detailed drawing on page 248


BILL OF MATERIAL
NO. NAME NO. SIZE
1 ANGLE IRON 6 2×2×32
2 ANGLE IRON 2 2×2×69
3 ANGLE IRON 1 2×2×22 1/2
4 CHANNEL 1 1/2×1 1/2×41
5 FLANGE 1 FOR 1" D. PIPE
6 ANGLE IRON 7 1×1×22 1/2
7 ANGLE IRON 2 2×2×42
8 ANGLE IRON 2 2×2×30
9 PIPE 1 1"×20
NOTE: WELD ALL JOINTS
13 5 13 17 41
89
16 1/2
22 1/2

Details of glue table and clamp rack. Louis Barocci, High School, Cudahy, Wis.

ENGLISH FOR TRADE AND VOCATIONAL SCHOOLS

J. ALLEN MORRIS
Murray Vocational School
Charleston, S. C.

(See preceding articles in January, September, and November, 1948, and January and May, 1949, issues)

Double Negatives

The spoken English of the average vocational school student contains numerous double negatives because he hears them frequently — at home, on the playground, or at work after school. So constant is the bombardment of double negatives that he uses them naturally, without hearing them at all; consequently they appear also in written work.

Before any boy can begin to eliminate double negatives, he must first understand enough about them to recognize and correct them. The following chart is very helpful:

Double Negatives

A negative is a word that means "No." Many negatives contain the word "No." These are negatives: no — not — none — nobody — nothing — nowhere — neither — never — scarcely — hardly.

Words with "n't" (short form for "not") are negatives: isn't — didn't — hasn't — doesn't — aren't — haven't — don't.

Two negatives should not be used together. When two negatives are used together, they make a "double negative" with an affirmative meaning (the opposite of negative: yes).

To correct this kind of mistake, leave out one of the negatives.

He has *not* had *no* experience. (Wrong: Neg. Neg. double negative)

He has not had any experience. (Corrected: one negative left)

He could *not hardly* breathe. (Wrong: Neg. Neg. double negative)

He could hardly breathe, or, he could not breathe. (Corrected: Notice the difference in meaning.)

A few brief explanations are usually sufficient to introduce work on double negatives; then begins the period of several years in which the instructor and student work together in an effort to eliminate double negatives from the student's speech and writing.

For preliminary practice work, I require each second-year student to write the following:

I. He didn t get no check last month. We aint got no time to play. I can t hardly finish this job. They couldn t find nothing. The colonists didn t have no money. Jack hasn t had no luck lately. He couldn t scarcely do it. We haven t got none. He don t know nothing about it. We don t never go nowhere.

II. Jack says that he can t find the pliers (anywhere — nowhere). They never do (anything — nothing) wrong. Neither of his friends has (ever — never) done anything worth while. They (had — hadn t) hardly reached the town when a crowd gathered. None of my shop jobs (was — wasn t) as hard as this one. Tom doesn t seem to have (any — no) self-confidence at all. Nothing (ever — never) bothers him. Bill's father says that he (can — can't) hardly afford to buy a new car. Don t tell me (any — no) lies. Nobody (should — shouldn t) do things like that.

III. Those blueprints (are no — aren t no) good. Harry (is — isn t) hardly smart enough to win a prize like that. They didn t

(ever — never) do (anything — nothing) right. When we went to the beach, there wasn t (anyone — no one) else there. None of the men (had ever — had never) flown a plane. Jim (is — isn t) scarcely strong enough to do work like that. Haven t you (ever — never) seen a baseball game? I can t do that (anyhow — nohow). There (is — isn t) no chance of his ever being graduated from school.

After this drill work has been completed, each spoken or written error is discussed with the student, refreshing in his mind the information on the "Double Negatives" chart. This continues throughout the second and third years.

By the time each student has reached the senior year, he is usually aware of the double negative and is willing to try to avoid it in his written work. In this year each boy's knowledge is retested; he writes one or several of the following drill sentences, all of which are taken from errors made by vocational school students:

I. 1. i couldn t find the word nowhere in the dictionary 2. we don t have no class next week 3. you don t put no comma in that sentence 4. i didn t make no mistakes in my theme 5. it don t make no difference 6. that catalog hasn t got no cover 7. i didn t know nothing about it 8. we didn t do none of those things 9. he won t be doing nothing this afternoon 10. i don t hardly believe nobody

II. 1. i don t want to use no double negatives 2. i couldn t find nothing to write about 3. i didn t learn nothing in grammar school 4. he don t know nothing about auto mechanics 5. she don t eat hardly nothing 6. there ain t nobody home 7. they ain t done nothing wrong. 8. i don t know nothing about that boy 9. he didn t get no punches on his card because he didn t do no work 10. i ain t never spent no money for no books to read

III. 1. that car ain t no good 2. it don t need no punctuation 3. you won t find nobody there 4. she can t think of nothing to say 5. i couldn t get nothing out of that book 6. he didn t have nothing to do 7. that coin ain t worth nothing 8. i couldn t remember nothing i studied 9. there ain t no way you can cheat on that job 10. we ain t never going to do nothing for nobody

IV. 1. he didn t have nothing left but a dime 2. i ain t done no work on that radio 3. if i don t read nothing, i can write a better theme 4. i didn t put no air in them tires 5. the doctor didn t say nothing about my eyes 6. i haven t did none of those sentences 7. he don t care nothing about nothing 8. they can t do nothing about it 9. i didn t have no room to work in 10. i can t see nothing wrong with these sentences

For an average student, the completion of these drills generally brings an end to mistakes in double negatives, both in speaking (in class) and in writing. No amount of classroom work can stop careless use of the double negative outside of school. Later, however, when the student matures socially and wishes to improve his spoken English, he will know how to avoid the use of double negatives.

INDIAN SILVERSMITHING

BEN HUNT
Hales Corners, Wis.

(Continued from page 207 of the May, 1949, issue)

Belt-Buckle Sets

The type of buckle shown in Plate 37 appeared in the western and southwestern trading

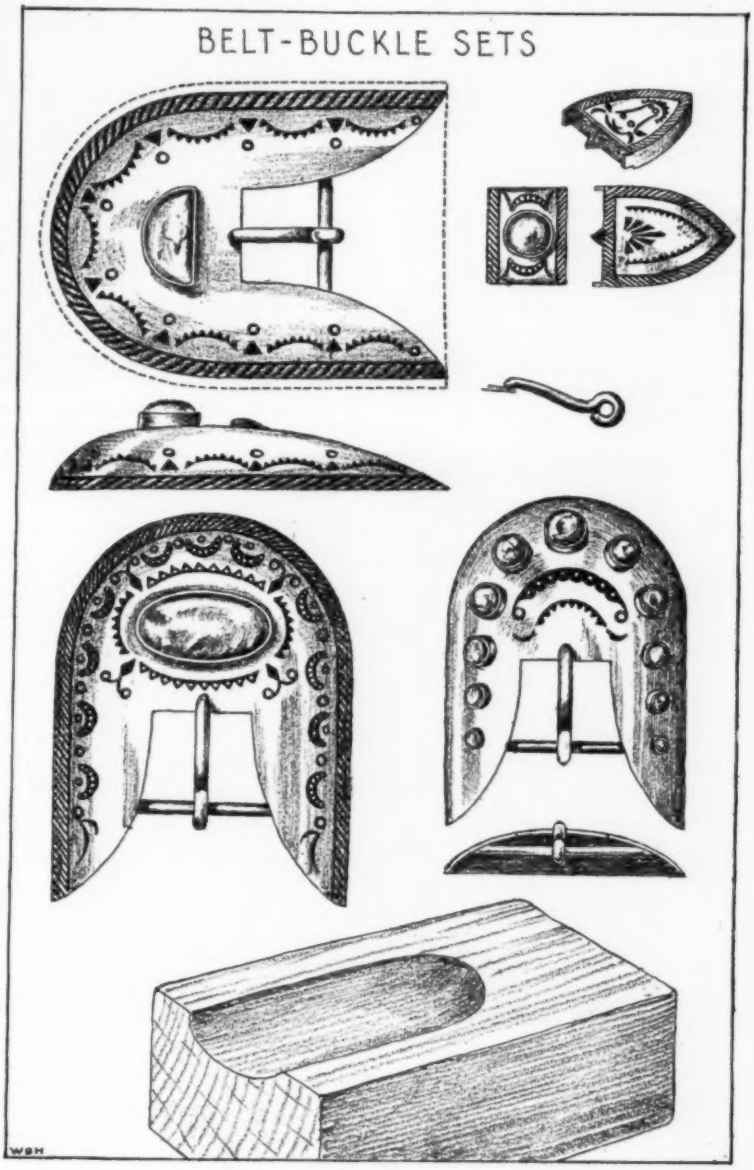


Plate 37

posts around 1946, and many of the buckles put up for sale are quite original. If variety is looked for, here is a chance to make an addition to any existing collection of belt buckles. The author tried cutting out the shape first, but after hammering for quite a while, decided to try stamping it and hammering it to shape before cutting out the back part of it, and it worked out nicely.

Cut the blank as shown in dotted lines at the top of Plate 37, and do the stamping also while it is flat. Then cut out a die of any hardwood, such as walnut, or maple. Cut it to the shape of the finished buckle as shown in Plate 37. Use a crooked knife or a gouge for this operation. A wooden mallet with a round end should be used rather than a ball-peen hammer. For such work as this, a maple mallet covered with rawhide, as shown in Figures 1 and 2, will be found very useful. Now shape the metal. If there are slight irregularities they can be smoothed with a file as in making rounded bumped up buttons, etc. When you have the silver shaped nicely, cut out the back with a jeweler's saw.

Since there were no matched small stones at hand, larger ones were used. The half round stone was cut from a broken oval stone. The bezels will have to be filed to fit the curve and when setting the stone it is well to cut out the center of the cardboard base usually put under the stone, to allow for the curve of the metal. Some of the metal may be filed away also before soldering the bezel in place.

Notice that the crossbar is set about halfway between the top and the bottom. Any end pieces may be used for the belt, either with or without stones as shown in Figure 3.

Some of these buckles are made with channel sets, and they looked very pretty especially when a band of channel sets similar to the shaped ring described in the April, 1949, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, was used instead of the round stones in Plate 37.

Fig. 1. Showing buckle stamped and ready for shaping on wood die

Fig. 2. Shaping with rounded, rawhide covered, wood mallet

GLOSSARY OF LUMBER TRADE TERMS

LOUIS BAROCCI
High School
Cudahy, Wis.

1. **AD** — air dried — moisture may run from 10 per cent to 30 per cent.
2. **KD** — kiln dried — generally 6 per cent but may vary from 6 to 10 per cent.
3. **B and Better** — the highest grade manufactured in white pine.
4. **C-Select** — a pine of high type finish and grade which contains no defects that will not permit its use in full width and length.
5. **D-Select** — a grade of pine between the finish grade of C-Select and No. 1 common. The defects are more general than in C-Select, but the wood is acceptable for cabinetwork.
6. **No. 1 Shop** — this is not a finish grade of pine. It contains scattered defects which will cut out and produce clear cuttings in sizes from 3 to 12 in. in width and from 3 to 10 ft. in length.
7. **C1F** — clear 1 face only.
8. **C1K** — clear of knots or unsound defects.
9. **Com** — common grade — indicates knots or other defects 1/3 of surface.
10. **DFPA** — Douglas Fir Plywood Association.
11. **Ext.** — exterior or highly water resistant grade of plywood.
12. **FAS** — first and second combination grades; average 88 per cent clear surface.
13. **FBM** — feet board measure.
14. **Fig.** — figured grain such as stumpwood, etc.

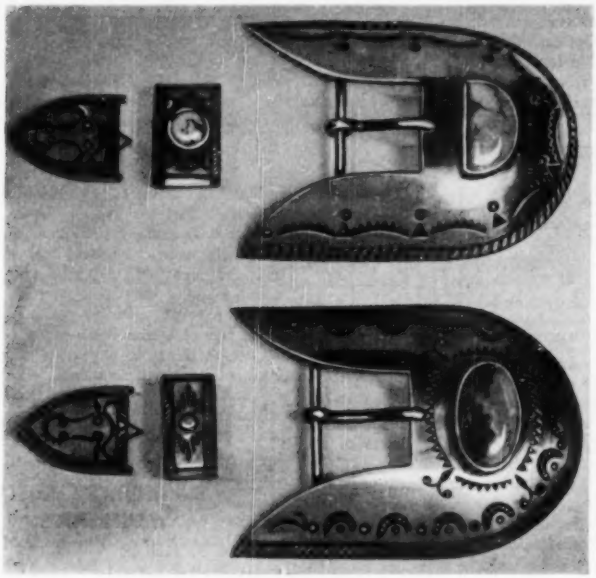


Fig. 3. Belt buckles and ends

15. **GIS** — good 1 side, in plywood, matched for grain and color.
16. **LG** — log run — all grades the logs produce.
17. **Lin. ft.** — lineal or running feet.
18. **MC** — moisture content — oven dry weight of lumber divided by total weight.
19. **NW** — needle wormy — very fine wormy holes as in mahogany.
20. **Pln** — plain sawed, not quarter sawed.
21. **Qtd.** — quarter sawed, cut across annual rings showing stripes.
22. **RC** — rotary cut — veneers cut on lathe.
23. **RS** — resawn.
24. **RWL** — random widths and lengths.
25. **SEL** — select grade — just below FAS in hardwood.
26. **Shop** — a cutting grade with scattered knots.
27. **SM** — surface measure.
28. **SND** — sap no defect.
29. **Snd2Sds** — sound 2 sides as in plywood, not color matched.
30. **Sq.** — square such as table and chair legs.
31. **S2S** — surfaced 2 sides, not edges.
32. **S4S** — surfaced flat sides and edges.
33. **S2S1E** — surfaced 2 sides and 1 edge.
34. **St GR** — straight grained.
35. **SW** — sound wormy.
36. **WHND** — worm holes no defect.
37. **WHAD** — worm holes a defect.
38. **VG** — vertical grain or quarter sawed.
39. **Ven** — Veneer.
40. **V joint** — beveled edges on T and G material.
41. **Uns** — unselected for color.
42. **TG&V** — tongue, grooved, and bevel edge on 1 side.
43. **T&G** — tongue and grooved.
44. **Check** — a lengthwise separation of the wood, the greater part of which occurs across the growth rings.
45. **Decay** — disintegration of the wood substance due to the action of wood-destroying fungi.
46. **Imperfect manufacture** — includes all defects or blemishes which are produced in the manufacturing processes, such as chipped grain, torn grain, loosened grain, nonuniform width or thickness, skips in dressing, mismatching, miscut, machine gauge, machine burn, and insufficient tongue or groove.
47. **Pitch streak**—a well-defined accumulation of pitch in the wood cells in a more or less regular streak.
48. **Pitch pocket** — a well-defined opening between annual layers of growth usually containing solid or liquid pitch.
49. **Pith**—the small soft core occurring in the structural center of a log.
50. **Shake** — a lengthwise separation of the wood, the greater part of which occurs between the growth rings.
51. **Wane** — the bark or the lack of wood from any cause on the edge or corner of a piece of wood.

PAPERWEIGHT

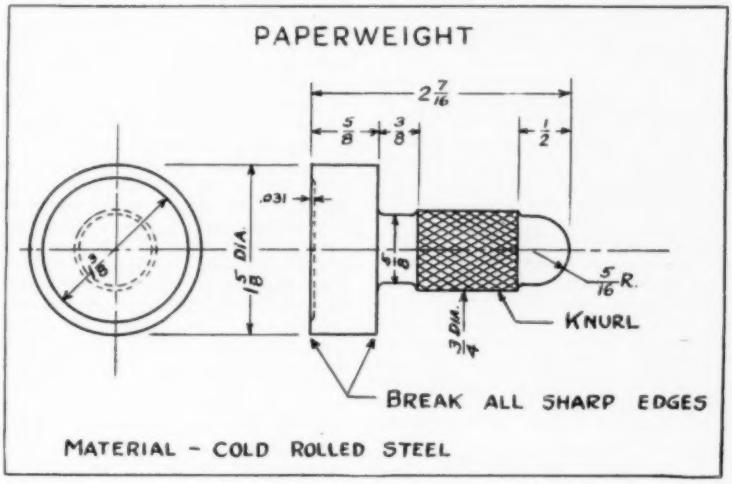
R. PAUL LIGHTLE
Industrial Arts Instructor
James H. Smart School
Fort Wayne, Ind.

What would you do if your supervisor appeared one day with a box containing one hundred pieces or so of cold rolled steel, 1⅝ in. in diameter, and ranging from 1 to 4 in. in length? "Here are some odds and ends left over from our war training classes; can you use them?" Naturally, one thinks he can. After the boss has gone you begin to ask yourself, "how?"

Some of our most successful projects come to us in just such manner. In our metal area we have two machine lathes. This means that each pupil will get to work approximately five class periods, or less than five hours. Under such conditions, the project must be simple and yet useful.

The paperweight meets these requirements. It is simple, involves varied learning operations, and is useful.

After all turning is completed, the job is polished in the lathe with fine steel wool, and then a coat of transparent lacquer should be applied. The lacquer prevents oxidation, thereby helping the steel to maintain that new look over a long period of time.



PLEXIGLAS FLOWERS AND ORNAMENTS

GEORGE F. HENRY
Head, Industrial Arts Education, and

RONALD R. BAUER
Student, Colorado A. & M. College

Fort Collins, Colo.

With the coming of spring, everyone welcomes the gay and colorful new flowers. One of the newest flowers blooming this year is the "plexi-rose." This beautiful flower comes in multi-colors and shapes and will not wilt, even in the hottest sun. With reasonable care, it will always look fresh and dainty. It can be worn as earrings, necklace, hair clip, novelty pin, or other ornament.

This newest creation in floral design is produced by using plexiglas, a clear, easily carved plastic. One of the most attractive features of this process is the third dimensional effect produced, resembling moss roses or coral flowers frozen in ice. Flowers in plastics no longer have that flat lifeless look, but appear to be fresh flowers preserved in glass. This effect is obtained by a special process of drilling the design in the plexiglas and then coloring it to suit the individual taste. The process takes only patience and careful handling and is easily done by the novice.

To make the work as easy as possible a small, light, handy electric tool with several attachments, including two sizes of fine drills, an abrasive wheel, and a felt buffer, may be used. If a buffer for polishing does not come with the electric tool, one can easily be made from a piece of heavy felt. The clear plastic, the annealing compound, and the special plastic dyes — the three primary colors — may be obtained from any plexiglas dealer or hobby shop. Plastic ¼ in. thick is preferable. Thinner sheets may be used, but they require that two or more pieces be cemented together to get the desired thickness. A coping saw, a flat fine-tooth file, number 3/0, 2/0, and 1 sandpaper, a very fine grade of steel wool, jeweler's rouge and an eye dropper are necessary. A small vise and hand clamps are very helpful.

First of all, cut a piece of plastic with a coping saw or jig saw to approximately the size you plan to use. If you do not have sufficient thickness, cement the plastic together with the annealing compound to obtain a thickness of approximately ½ inch. The plexiglas will weld together much easier and look much nicer if the pieces are cemented together before any other work is done. Let the plastic remain in the hand clamp or vise for at least 24 hours to insure thorough drying.

Transfer the flower design by placing the plastic on top of the design and trace the design onto the plastic with a red or a soft lead pencil. Once the design has been drawn on the plastic, be careful not to rub off the pencil marks. Select a fine pointed drill like the one shown in Figure 1. Start drilling from the surface on which the design is drawn. Make the petals of each flower from one hole. Make each petal a separate shaft about ¼ in. deep, but drill from the same hole. See Figure 2.

FIG. 1

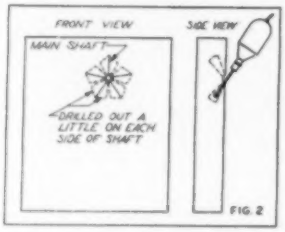


FIG. 2

After the first shaft is made, go slightly to either side to shape the petals. Make the ends of the petals a little deeper to give the flowers a more lifelike appearance. Turn the plastic over frequently to check the effects of the drilling.

After the petals have been made, begin to make the stem and leaves by means of individual shafts drilled in the desired direction. Make all shafts for one leaf from the same hole. See Figure 3. Begin each new shaft for the stem slightly over the end of the preceding one so as to appear as a continuous line, as shown in Figure 3. The dots are the holes from which the shafts are drilled. In all drilling, be sure to drill a straight line so as not to bend the drill. Do not connect the stem shafts with the petal shafts, as it would make dying more difficult.

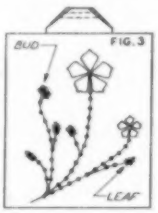


FIG. 3

After all of the design has been drilled, the piece is ready for coloring. Mix the desired colors in a very small glass. Approximately two thirds of an eye dropper of each color dye is enough to color the design. After the colors are mixed, put about three drops in the hole for the petals. The longer the dye is in the petals, the darker the color. To remove the excess dye, absorb with a piece of cotton pushed into the hole. Next, drop about two drops of green dye in each hole making up the stems and leaves. This dye may have to stay in about five or ten minutes, as it is slower to act on the plastic. The leaves can be made to have any shade by absorbing the excess dye or redying.

After the design has been colored, buff off the scratches on the back of the piece. Try to keep from getting scratches on the object. Shaping the object must be done very carefully. The third dimensional effect is emphasized by putting chamfers, or facets, or cutting the surface of the piece in the form of a cabochon, as shown in Figure 4. Use the grinding wheel and file for this work.

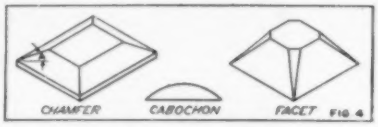


FIG. 4

Make the chamfers any desired degree, but remember that the smaller the angle *A*, the greater will be the third dimensional effect. Polish the marred surfaces first with No. 1, 2/0, and finally with 3/0 sandpaper. Then use a fine grade of steel wool; and last, buff with jeweler's rouge. Finally, polish with just a clean felt or cotton buffer wheel. One of the important things to remember is to keep the surfaces free from scratches.

The beautiful, fresh, lifelike flower resulting will make you feel that the time and patience spent on this project were well spent.

ELEMENTARY AUTO MECHANICS

FRANK B. MILLER
Central High School
Tulsa, Okla.

(Continued from page 218 of the May, 1949, issue)

Assignment Sheet No. 44 — Attaching Water Hose Lines

Why this is done:

In order to operate a motor long enough to make any running adjustments, it is necessary to use running water to keep it cool, there being no radiators for most of the motors.

Procedure:

1. See that all gaskets in the water circulating system are tight.
2. Attach the hose adaptors to the inlet and outlet openings in the block.
3. See that the drain line is open all the way back to the sewer.
4. Attach the supply water line to the inlet connection and the drain line to the outlet connection.
5. Test the water system for circulation and leaks by turning on the water line before starting the motor.

Questions:

1. Would running water be more or less effective for cooling a motor than a radiator?
2. Why can a hose line be used without a pump when a radiator system uses a pump driven by the motor? Would a radiator system work without the pump?
3. Why is the water inlet opening at the bottom of the block, with the water running up through the block, instead of starting at the top where gravity would help the flow?

Text reference: ....

Assignment Sheet No. 45 — Regulating a Carburetor

Why this is done:

To get the most efficient and at the same time the cheapest motor performance, it is

necessary to regulate the carburetor until it produces the best fuel mixture.

Procedure:

1. Start the motor and let it warm up for a few minutes.
2. Reduce the speed to idling and with the choke wide open adjust the air mixture for the smoothest motor operation. If a vacuum gauge is available adjust the carburetor to produce the highest vacuum.
3. Reduce the idling speed adjustment to a point just before the motor dies, and recheck the air adjustment.
4. Accelerate the motor suddenly to test the readiness with which the motor picks up. If it fails to pick up readily, decrease the amount of air and try again.
5. If motor continues to fail to pick up, check over the action of the accelerator pump.

NOTE: In the case of a downdraft carburetor, the pump action can be watched in operation by removing the air cleaner.

6. Where the carburetor has a gasoline as well as air adjustment, set it at the point which seems to give best motor performance and readjust the air valve.

NOTE: The most satisfactory way to adjust the liquid valve flow is by means of the flow meter.

Questions:

1. Why make carburetor adjustments only after the running motor has had time to warm up?
2. Why make the valve adjustments at idling speed instead of high speed?
3. Give at least one result each of too rich a mixture and too lean a mixture.

Text reference: ....

Assignment Sheet No. 46 — Attaching the Exhaust Outlet

Why this is done:

Due to the poisonous gases given off by a running motor, it is necessary to carry off the exhaust to a point where it can be dissipated into the air sufficiently far away from everyone to prevent injury to health.

Procedure:

1. Check all gaskets in the exhaust system to see that they are tight.
2. Attach flexible exhaust pipe to manifold opening, with gasket properly in place.
3. Adjust the position of the exhaust line so that it will be least apt to burn anyone.
4. When the motor is first started, check the exhaust lines for leaks and correct any found.

Questions:

1. Why not wrap the exhaust line with insulation to prevent anyone getting burnt?
2. Why would the exhaust leak out a comparatively small opening rather than passing out through the larger pipe?
3. What two dangers would be present if the exhaust gases were released in a room directly from the manifold?

Text reference: ....

Assignment Sheet No. 47 — Attaching Cables to a Battery

Why this is done:

In order to get power for starting purposes, it is necessary to connect a storage battery to the starter by special battery cables.

Procedure:

1. Your motor should be equipped with its own pair of cables, properly numbered. If not, get instructor's O.K. to check out necessary cables.
2. Identify the positive and negative battery posts.

NOTE: Shop batteries are marked on the case, but in commercial practice, the positive post is identified by being marked, by a red washer, or by being larger than negative post.

3. Examine the cable terminal to determine which end of the tapered opening is larger.
4. Loosen the terminal clamp so that it will slip *freely* over the battery post, *large end down.*

CAUTION: *Never* hammer, pry or twist terminals on or off battery posts, as the posts break off easily.

5. After terminal is in place, tighten the terminal bolt securely so that a rigid connection is made. Avoid shorting out the battery with the screw driver or wrench when tightening the bolt.

NOTE: Usually the longer cable connects the positive post to the starter switch.

Questions:

1. Why are terminals tapered?
2. Why are connections made of lead and brass instead of steel? Give two reasons.
3. What is the result of a loose connection at a battery?

Text reference: ....

Assignment Sheet No. 48 — Testing Battery Connections

Why this is done:

Sometimes a battery is apparently correctly connected to a starter, but will not turn the starter over. In such a case it is necessary to check the battery connections to see if they are working, and to find which one, if any, is defective.

Procedure:

1. Short the live side of the starter switch, momentarily, against the frame of the motor and see if a heavy spark results.

NOTE: Shorting a battery is the only check (in the absence of a voltmeter) to determine if there is enough voltage to start a motor, and the size of the spark gives an approximate indication.

2. If no spark results, short the battery posts themselves. A heavy spark indicates battery O.K.

CAUTION: In shorting a battery be sure to break the short instantly after it is made, as continued shorting discharges the battery rapidly and burns the contacts.

3. If battery is charged, short one post against the opposite cable terminal and repeat with the other post and terminal.
4. If terminal and post contacts are good, short each post in turn against the motor frame to find the defective cable.

Questions:

1. What are two bad effects of putting a terminal on a battery post upside down?
2. What is the result of hammering on the terminal to tighten it on the post? What sort of material supports the post?
3. Why do the contacting parts try to stick together when you short a battery in testing it?

Text reference: ....

Assignment Sheet No. 49 — Removing and Replacing Starter

Why this is done:

In order to overhaul a starter and also to clean the motor block under the starter, it must be removed from the engine.

Procedure:

1. Remove any wire connections.
2. Disconnect starter pedal.
3. Loosen cap screws holding starter casing in the flywheel housing, and remove the bottom two screws.
4. Support the starter carefully with one hand and remove the top screw.
5. Draw the starter case out of the housing, being careful not to drop it as it is heavy and usually made of cast iron.

NOTE: In the event the starter bolts were not readily accessible, as on some Chryslers, the starter case is usually held in place by a large setscrew in the top of the fly-wheel housing, and can be removed when that screw is loosened.

6. Remove the starter switch.
7. Clean the starter case with kerosene and replace switch.
8. Replace starter in housing and bolt tightly in place.

Questions:

1. Why remove the bottom bolts first?
2. What would be the result of tightening one case bolt down tight before starting the other two?
3. Give two or more strains to which the starter case bolts are subjected in operation.

Text reference: ....

Assignment Sheet No. 50 — Checking Starter Switch Operation

Why this is done:

Often in trying to start a motor, the starter will not work even though the two cables are carrying battery current up to the switch. It is then necessary to check the condition of the switch.

Procedure:

1. Examine the switch and tighten any loose connections.
2. If starter still fails, remove the switch and hold the positive cable directly on the starter contact point. Starter action under this hookup locates the trouble in the switch.
3. Examine the switch for a break in the insulation of the contact point, and replace any missing parts.
4. Hold the switch on the starter to see that connection can be made between the two contact points.
5. Examine the switch closing mechanism to be sure the switch is pushed down far enough to complete the connection.
6. Clean any pitted or burned parts.

Questions:

1. What would be the result of a switch bolted loosely on the starter case?

2. What would be the result of too short a depressing arm in the switch closing mechanism?

3. What would cause pitting or burning of the starter switch?

Text reference: ....

(To be continued)

BEDSIDE STAND

G. C. HENRIKSEN
Public Schools
Portland, Ore.

This project of a bedside stand evolved from the request of a friend in the Veterans Hospital for some additional space on which to lay miscellaneous materials, such as stationery, pen and pencil, magazines, and the like. The usual bedside stand is generally cluttered up with medicines, trays, and other similar articles, leaving no space for a man's personal effects. This auxiliary stand is designed high enough so that a radio can be placed underneath, while the length gives a close fit inside the end rails of the hospital table. The tray effect prevents articles from rolling off on the floor, and the light construction plus the handles make it possible to place the stand on the bed for use as a reading and writing desk.

Methods described here were designed to make this a one-evening project. Some improvements can be made on the basis of personal choice which would require a longer time for the construction and finish.

Bill of Materials

This table was made out of ⅜-in. hardwood plywood, but soft plywood or even ¾-in. material would be satisfactory.

No. of pieces	*Size*
2	⅜ x 9 x 12 in.
2	⅜ x 1⅞ x 22½ in.
1	⅜ x 8¼ x 21¾ in.
1	⅜ x ¾ x 58½ in.

Procedure

1. Prepare the two ends according to the accompanying layout. The design on the end can be varied to suit individual tastes.

2. After the two sides have been squared up they are fastened to the ends by means of wood screws. Other methods can be used, including nailing and gluing.

3. The tray in the accompanying diagram is supported by means of strips which are fastened to the side and end pieces. However, finishing nails driven through the sides and ends into the tray itself have been found to be satisfactory, thus eliminating the supporting strips. In this case the piece, ⅜ by ¾ by 58½ in., would not be needed.

Finishing

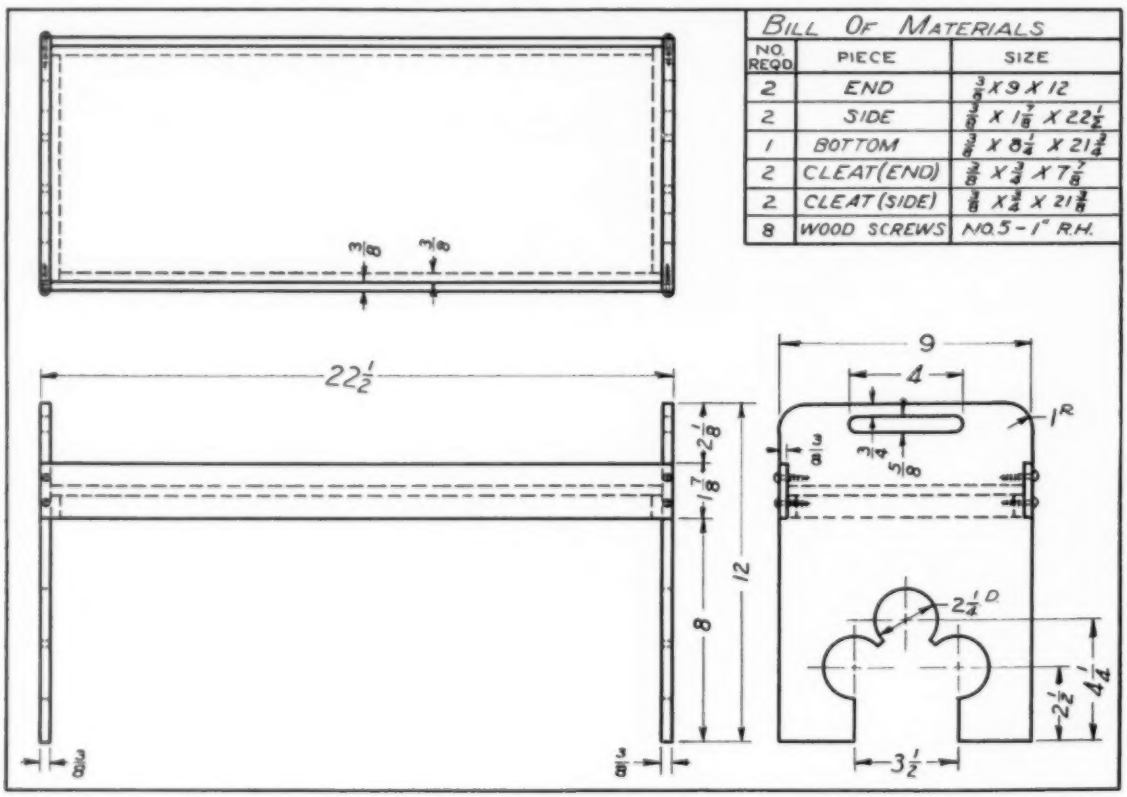
4. Due to the urgent need for this table a hasty job of finishing was done. A coat of orange shellac was followed by rubbing down with No. 4/0 steel wool. This was then followed by a coat of wax. If time permits, a coat of good valspar varnish on top of the white shellac would make this table more serviceable.

PLACEMENT OF MECHANICAL DRAWING STUDENTS IN INDUSTRY

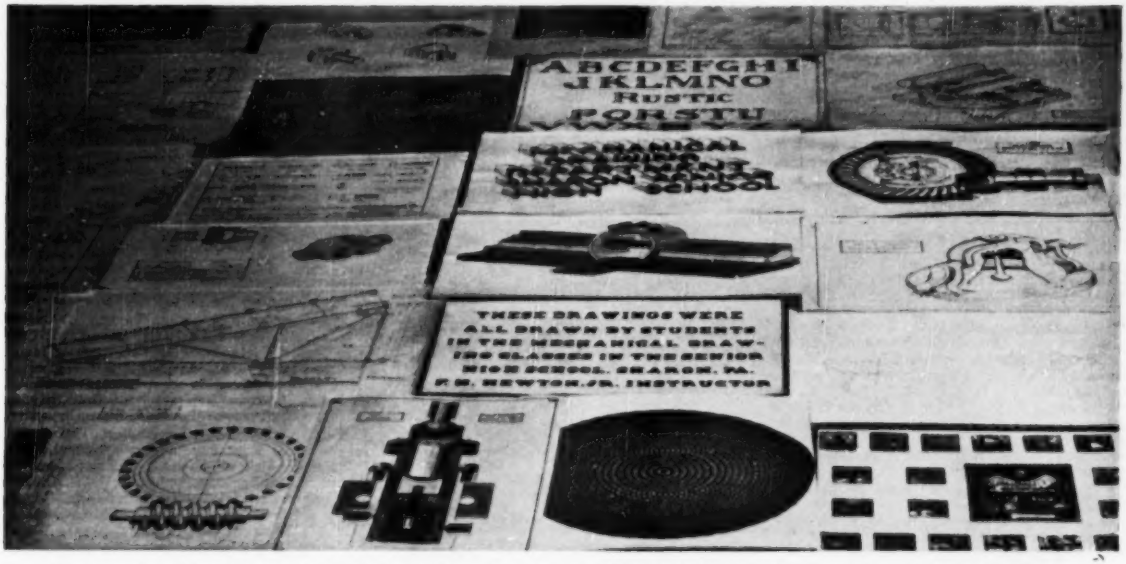
F. N. NEWTON, JR.
Supervisor, Industrial Education Department
Sharon, Pa.

One of the questions that confronts every industrial teacher at one time or another is "What happens to my students after they graduate?" This has also troubled me, so some years ago I decided to find out just how I might help many of the deserving students that went through the drafting department.

Just before school let out in the spring I contacted one of our local furniture stores regarding securing one of their large windows



Bedside stand by G. C. Henriksen



Work produced by the drafting students at Sharon, Pa. Submitted by F. N. Newton, Jr., supervisor, industrial education

for a display of our students' work. The manager was reluctant at first to give me the window for he said he hated to tie it up as it was one of their mediums of advertising. He finally consented to give me the use of the window for a period of two days.

I figured that if I could put on a display I would secure the interest of our taxpayers, get them talking about the work, and that by so doing, the manufacturing concerns in our valley would more readily listen to me when I started my campaign for placing my graduates.

With the help of one of my students I put the drawings in the window. At the end of the second day, I called to take them out and the manager asked me to leave them for two more days. He informed me that they had attracted more attention than anything placed in the window since he had been connected with the store.

Soon after the drawings were removed, I started out to contact heads of the personnel departments of our plants. Our community is located in an industrial valley, which specializes principally in steel mills and plants using steel in manufacturing their product. There is also a very large Westinghouse plant which normally employs several thousand men. Practically all of these plants have drafting departments, some of them quite large.

On my calls I took samples of work that some of the boys had done and endeavored to direct the conversation around to the display that I had placed in the window. In most cases the employment or personnel officer had seen the display and was glad to talk to me about my students and to take time to look over the drawings that I had brought along at close range.

Shortly after I had made my calls, I began to get telephone calls from these different people. In two years I placed forty boys in drafting rooms. It was not long until the news got around that it was possible to secure reliable boys by contacting our high school and soon I began to get calls from some of the merchants. I placed a boy as a show card writer, in a department store, and two boys in a radio laboratory.

I did not forget the boys after I placed them, but each month I make the rounds to check with the department head where the boy is working. At times I find a boy who does not seem to be getting on as he should. The employer sends for the boy and I have a talk with him in order to try to find out the cause for his trouble. In most cases his trouble can be ironed out. At the present time, I have secured jobs for better than 300 boys, mostly in our local industries, and in each case where mechanical drawing was a prerequisite for the job.

This article was not written to advertise our local high school, but just to show industrial arts and vocational teachers the possibilities that exist in the average medium-sized city for placement of graduates in industrial plants.

The personal contact will go a long way to get the industries school conscious, but once they are, it is up to the industrial teacher to turn out a product that can make good when he is placed on the job. These visits also help to maintain fine public relations.

The accompanying illustration gives an idea of the type of window display our drafting department puts on every two years in one of the prominent store windows in our business district.

Personal News

PRESIDENT OF BRODHEAD-GARRETT DIES

Charles F. Macrae, president of the Brodhead-Garrett Company of Cleveland, Ohio, died on March 12 as the result of a heart ailment.

Charles F. Macrae

Mr. Macrae was 59 years old and was a native of Burlington, Vt. He attended high school there and later attended the Lawrence Academy at Groton, Mass., and the University of Vermont at Burlington. He joined the Brodhead-Garrett Company in 1912 as salesman, later advancing to sales manager, general manager, and in 1942, became president.

Mr. Macrae was prominent in the American Industrial Arts Association, American Vocational Association, and the National Hardwood Association. He was a member of the Cleveland Chamber of Commerce, the Chagrin Valley Country Club, City Club of Cleveland, Epsilon Pi Tau Fraternity, and the Newcomen Society of England.

He is survived by his wife, his mother, and a brother.

♦ RALL I. GRIGSBY has recently been appointed deputy commissioner of Education, Federal Security Agency, Office of Education, Washington, D. C.

Dr. Grigsby, a member of the Office of Education staff since 1939, served as Acting Commissioner of Education from July 15, 1948, when Dr. John W. Studebaker resigned as Commissioner, until March 18, when Dr. Earl James McGrath assumed office.

While serving as Acting Commissioner of Education, and since the appointment of Commissioner McGrath, Dr. Grigsby held the position as Director of the Division of Auxiliary Services, one of the eight major divisions in the Office of Education. Prior to this he was a member of the Vocational Education Division staff, and served as Special Assistant to the Commissioner of Education.

♦ DR. SHRIVER L. COOVER, head of the industrial-arts department of the State Teachers College at California, Pa., will teach in the industrial education department of Colorado A. & M. College at Fort Collins, during the 1949 summer session.

♦ WILLIAM BAUMRUCKER, former shop supervisor, and for 42 years a teacher in the Chicago public schools, died at his home in River Forest, Ill., last March 17. Thirty years of his teaching career were spent at Crane Technical High School. Mr. Baumrucker had retired from teaching in 1942.

He is survived by his widow, a daughter, and two sons.

♦ VAN C. WHITTEMORE has resigned as director of the State Agricultural and Technical Institute, Canton, N. Y., after 25 years of service.

W. T. LONG, head of the agricultural division of the school, will take his place as acting director.

♦ EVERETT J. SHINDLER received the M. of Ed. degree from the Texas A. & M. College in July, 1948, and is now employed as safety engineer for the Aetna Casualty and Surety Corporation, New Orleans, La.

♦ Robert Ross, director of the placement bureau of the guidance department of the Poughkeepsie High School, Poughkeepsie, N. Y., provides job counsel and information on vocational selection and placement in full-time, part-time, and summer vacation jobs for students as well as alumni of the school. During the past school year the department had approximately 1500 requests for employees.

♦ ALBERT C. MOOREHEAD, formerly of Greenville, Miss., Junior High School, completed the M. of Ed. degree from the Texas A. & M. College in July, 1948, and is now employed as head of the industrial-arts department, Conroe, Tex., high school.

♦ At the beginning of the second semester, WALTER REVELL, who has been a student at the Kansas State Teachers College, Pittsburg, Kans., joined the staff of the Parsons, Kans., schools as an instructor in industrial arts.

♦ JACK W. MORGAN completed his work for the master's degree at the Kansas State Teachers College, Pittsburg, Kans., and enrolled for the second semester in the department of industrial education, University of Missouri, for work on his doctorate. He will be a part-time instructor of drawing while taking graduate work for the advanced degree.

♦ C. L. MILLER, director of industrial arts and vocational industrial education in the Corpus Christi, Tex., public schools, received his M. of Ed. in industrial education from the Texas A. & M. College during the summer of 1948.

♦ H. C. WALKER, elementary-handicrafts instructor of the Southgate School, Corpus Christi, Tex., completed his work for his M. of Ed. degree in industrial education from the Texas A. & M. College in the summer of 1948. He resumed his position in September, 1948.

♦ HERMAN J. VAVRA received his M. of Ed. degree in industrial education from the Texas A. & M. College in the summer of 1948. Mr. Vavra was recently promoted to supervisor of industrial arts at the Carr Central High School, Vicksburg, Miss.

♦ THOMAS D. BOWLES completed work for the M. of Ed. in industrial education from the Texas A. & M. College in August, 1948. Mr. Bowles is now employed in the State Agricultural and Mechanical College of Magnolia, Ark.

♦ HENRY E. CHITSEY accepted a position as teacher of industrial arts in the Monahans, Tex., High School. He received his M. of Ed. degree in industrial education from the Texas A. & M. College in July of 1948. While a student working on his master's degree, he was a graduate assistant in the industrial-education department.

♦ EMMETT C. MCLARTY completed the requirements for the M. of Ed. degree in industrial education in the summer of 1948 and is presently head of the industrial arts department in the Stephen F. Austin high school of Bryan, Tex. Mr. McLarty also serves as a critic teacher in the industrial education department of A. & M. College.

♦ ALLEN R. NYE, instructor in the Veterans' Vocational School at San Antonio, Tex., received his M. of Ed. degree in industrial education in the summer of 1948 from Texas A. & M. College.

♦ WALLIS J. DESPAIN, instructor of engineering drawing at the University of Nebraska, Lincoln, Neb., received his M. of Ed. degree in industrial education from the Texas A. & M. College in August, 1948.

♦ ODUS C. KERLEY, teacher of drafting in the N. R. Crozier Technical High School in Dallas, received his M. of Ed. degree in industrial education in July, 1948, from the Texas A. & M. College. Mr. Kerley also served as a part-time instructor during the summer term at the college.

Association News

♦ Alpha Iota Chapter of Epsilon Pi Tau, national honorary professional fraternity for industrial arts and vocational-industrial education, was installed at Louisiana State University, Baton Rouge, La., on April 8, 1949, by Dr. W. E. Warner, national president of the fraternity. He was assisted by Dr. J. R. Ludington, specialist for industrial arts, U. S. Office of Education; H. O. Thomas, supervisor for industrial arts, Louisiana State Department of Education; and L. L. Waite, supervisor for industrial arts, Caddo Parish School Board, Shreveport, La.

This is the first chapter of this fraternity in the Deep South region of the United States. R. E. Stucki, instructor in industrial education, Louisiana State University, will be faculty trustee for the fraternity.

Thirty-one people which included one lady were initiated.

The initiates shown in the picture are:

Front row (Left to right): John S. Pearce, Specialist in Industrial Arts, New Orleans; Miss Violet O'Reilly, Principal, Rabouin Trade School for Girls, New Orleans; Charles Gremillion, student vice-president; Russell Williams, student president; William Mangus, student secretary-treasurer; R. E. Stucki, Instructor, Louisiana State University and faculty trustee.

Second row: H. J. Braud, Director, Avoyelles Parish Trade School, Cottonport, Louisiana; Cassius Clay, student; Frank Guidroz, student; James Thibodeaux, student; Edward Russo, teacher in New Orleans; James Russo, student; E. G. Smith, Associate Professor, Louisana State University, P. V. Rougon, Instructor, Louisiana State University.

Third row: Dr. N. A. Hauer, Head, Department of Industrial Education, Louisiana State University; E. H. Flaherty, Director, Sullivan Memorial Trade School, Bogalusa, Louisiana; J. W. Mitchell, State Supervisor for Trade and Industrial Education, Baton Rouge, Louisiana; Calvin Dunlap, student; Buckley Warrington, student; Adolph Dubourg, student; Benjamin Alsip, student; R. H. Smelser, Director, Southwest Louisiana Trade School, Lake Charles, Louisiana; C. G. Mainous, Assistant Professor, Louisiana State University.

Fourth row: M. Yarbrough, Instructor, Louisiana State University; Frank Rush, Co-ordinator Baton Rouge Trade School, Baton Rouge, Louisiana; W. H. Bohnstorff, teacher in New Orleans; J. W. Moore, Director, Shreveport Trade School, Shreveport, Louisiana; T. E. Hampton, Director, Natchitoches Trade School, Natchitoches, Louisiana; H. P. Willis, Director, Ouachita Valley Trade School, West Monroe, Louisiana.

Student officers for this year are Russell Williams, president; Charles Gremillion, vice-president; and William Mangus, secretary-treasurer.— *Ralph E. Stucki.*

♦ The Connecticut Industrial Arts Association's Sixteenth Annual Spring Conference was held at New Britain Teachers' College on April 8 and 9.

The main theme of the meeting was "Guidance Through Industrial Arts."

The topic was very well covered by the main speaker, James J. Hammond, director of industrial arts and associate professor of education at State Teachers College, Fitchburg, Mass. His two lectures were most inspiring and left us with much to think about.

The dinner was held at the Indian Hill Country Club and the luncheon meeting on Saturday at

(Continued on page 14A)

Epsilon Pi Tau initiation at Louisiana State University

Into the production of POST Drawing Instruments goes not only the finest of materials but also the pride of the professional instrument maker. Even the most inexpensive POST Drawing Instruments demonstrate this superb workmanship . . . and are an object lesson in precise attention to detail.

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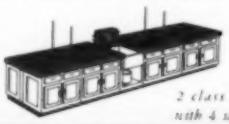

2 class Physical Chemistry Table with 4 student positions.

World's Largest Exclusive Manufacturer of Laboratory and Educational Equipment

E. H. Sheldon & COMPANY
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ASSOCIATION NEWS

(Continued from page 256)

Marcus White Hall, New Britain Teachers College.

There were many good exhibits from schools in the state, fine manufacturers' exhibits, and many interesting demonstrations presented in the Teacher's College gym.

On Saturday morning at the business meeting new officers were nominated and voted in for a two-year term (1949–51). They are as follows: president, Edwin M. Harris, Basset Jr. High School, New Haven; vice-president, John Fuller, Central Jr. High School, New Britain; vice-president, Lawrence Marinaccio, Elias Howe School, Bridgeport; vice-president, Vernon Stapleford, Basset Jr. High School, New Haven; treasurer, Jack Crowe, Crosby High School, Waterbury; secretary, John Loiko, Branford High School, Branford.

The membership committee reports 185 members in our association. This is very good, but we would like to have many more. The number of members in an organization determines its strength.

♦ The Southwest Region of the Iowa Future Teachers Association held its annual spring meeting on the Iowa State College campus, March 28.

Under the direction of Dr. Ray Bryan, chapter faculty sponsor, the program was planned by a central committee composed of two members from each of the three education clubs on the campus. The theme of the meeting was "The Future Teacher Views Professional and Public Relations."

High-lighting the day's activity was a 25-minute broadcast of a panel discussion composed of a member from each of the represented schools.

Southwest Regional IFTA Chapters are Iowa State College, Drake University, Central College, Clarinda Junior College, Graceland Junior College, Centerville Junior College, Creston Junior College, Red Oak Junior College, and Simpson College.

♦ The 1949 Four-State Regional Conference, which includes the states of Arkansas, Kansas, Missouri, and Oklahoma, will be held at the Kansas State Teachers College, Pittsburg, Kans., on October 21 and 22.

Featured speakers include Dr. Arthur B. Mays of the University of Illinois, Urbana, Ill., who will speak on "The Role of the Public School in Industrial Education," and "The Meaning and Place of Industrial Arts in Secondary Education"; and Dr. Fred W. Hosler, superintendent of the Oklahoma city public schools, who will discuss the "Educational Challenges for Forgotten Students."

♦ The Fourteenth Annual Pennsylvania Industrial Arts Conference under the chairmanship of Shriver L. Coover which was held at the California, Pa., State Teachers College April 22 and 23, attracted well over 1000 visitors each day.

The Friday session was devoted entirely to teaching demonstrations and exhibits by the 420 industrial arts majors at the college and to exhibits of commercial products. The high school seniors of the area were the special guests at this meeting.

The Saturday morning meeting featured an address "Industrial Arts at the Crossroads" by Dr. Kenneth W. Brown, director of industrial arts of Philadelphia, and an address by Dr. George Miller, chief of art education for Pennsylvania.

At the luncheon meeting Dr. John Ludington, specialist in industrial arts, of the Office of Education, Washington, D. C., gave an inspiring address on "Industrial Arts in National Perspective."

News Notes

♦ The National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y., is again calling attention to the shortage of teachers and supervisors of classes for the partially seeing. The following colleges and universities are offering summer courses for preparation in this field, but demonstration classes will not be available in all of the courses listed. Candidates should contact the person indicated for full information:

June 13–July 22. Tulane University, New Orleans, La., Director of Summer Session.

June 16–July 23. Florida State University, Tallahassee, Fla., Dr. R. L. Eyman, dean, School of Education.

June 19–July 29. University of Hawaii, Honolulu, T. H. Director of Summer Session.

June 20–Aug. 12. Illinois State Normal University, Normal, Ill., Dr. Rose E. Parker, director, Division of Special Education.

June 20–July 29. Los Angeles State College, Los Angeles, Calif., Director of Summer Session, 855 N. Vermont Ave.

June 20–July 29. Michigan State Normal College, Ypsilanti, Mich., Dr. F. E. Lord, director, Horace H. Rackham School of Special Education.

June 27–Aug. 5. Wayne University, Detroit, Mich. John W. Tenny, general adviser, Education of Handicapped Children, College of Education.

June 28–Aug. 5. San Francisco State College, San Francisco, Calif., Dr. Leo F. Cain, director, Special Education.

July 5–Aug. 12. Teachers College, Columbia University, New York, N. Y., Admissions Office.

SUMMER WORKSHOP INVITES NATIONAL LEADERS

In order to provide individuals interested in vocational education with an opportunity to hear and discuss with outstanding national leaders

(Continued on next page)

NEWS NOTES

(Continued from page 14A)

in this field, the problems relating to the organization and development of vocational curricula both on a high school and post high school level, the School of Education, University of Michigan, Ann Arbor, has arranged to conduct a Workshop during the summer of 1949.

Some of the participants in this Workshop are: Walter Cooper, chief, trade and industrial education, United States Office of Education, Washington, D. C.; Arthur Mays, professor of vocational education, University of Illinois; Eugene Fink, State Department of Education, Albany, N. Y.; and F. W. Ziegenhagen, principal, Boys' Technical High School, Milwaukee, Wis.

Michigan State Office of Vocational Education, director and chiefs will also participate in this program.

There will be two sections of the Workshop: the first, from June 27 to July 8; the second, from July 11 to July 22. The students may elect one or both sections.

Detailed information regarding this Workshop may be had by writing to: A. A. Vezzani, Lecturer in Vocational Education, Department of Vocational Education, Room 4200C, University High School, Ann Arbor, Mich.

♦ The accident prevention department of the Association of Casualty and Surety Companies, 60 John St., New York 7, N. Y., has issued a booklet, "Your Guide to Safety in Woodworking Shops." This publication is one in a series developed for exclusive distribution through the Capital Stock Casualty and Surety Companies to help provide safety for everyone.

♦ The Federal Security Agency, Office of Education, Washington, D. C., has issued Bulletin Misc. 3162 Rev. 1949 entitled "Offerings in Guidance Work in Colleges and Universities." This is the fifth annual directory of colleges and universities offering courses in guidance work, and has been prepared in response to many inquiries for offerings in this field.

The data are presented in two parts: Part I — Courses offered in guidance work, summer of 1949; Part II — Workshops, co-operative counselor training plans, conferences, institutes, and the like to be held during the summer of 1949 in guidance work.

This bulletin was prepared by Clifford P. Froehlich, specialist for training guidance personnel, Occupational Information and Guidance Service, under the direction of Harry A. Jager, chief, Occupational Information and Guidance Service, and John D. Russell, director, Division of Higher Education.

♦ A paper-covered publication entitled "Opportunities in Home Economics," has just been made available by the American Home Economics Association, 700 Victor Building, Washington 1, D. C. This is the latest and most complete pamphlet to be had on career opportunities in the widely diversified field of home economics. It is especially adapted for guidance workers and vocational counselors, but is also of considerable interest to students. Single copies sell for 75 cents, and quantity discounts are available upon request.

♦ A new index of the sound motion pictures and slide films which can be loaned to schools has been prepared by the School Service Department of the Westinghouse Electric Corporation. These materials can be borrowed free-of-charge except for transportation costs.

The motion pictures and films described in the catalogue cover a wide range of subjects and can be used for either general assembly programs or for home economics, industrial arts, salesmanship, science, and social science classes. A small section of the catalogue describes various teaching-aid charts and transcriptions which are also available in connection with these pictures and films. For convenience in requesting the films and supple-

(Continued on next page)

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INDIA COMBINATION BENCH STONE — has both coarse and fine sides and is factory pre-filled with oil.

INDIA ROUND EDGE SLIPS — for gouges, moulder knives, bead planers and other curved-edge tools.

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It's easy to show your students the correct, easy way to keep their tools professionally sharp with the *right* INDIA oilstones. These hard, quick-cutting stones are made of famous NORTON kiln-fired vitrified aluminum oxide "grinding wheel grit." The grains are all tough, sharp and uniform. And INDIA oilstones are available in various sizes, shapes and grits. Exclusive oil pre-filling at the factory enables these stones to cut faster with less loading. Some, such as the INDIA Combination Bench Stones, are made with two sides — one coarse for quick cutting — the other fine for a keen finish. Whatever the tool, there's a *right* INDIA oilstone to keep it sharp.

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This free 48-page booklet is packed full of informative data, illustrations and diagrams on sharpening shop tools. Write for your copy today.

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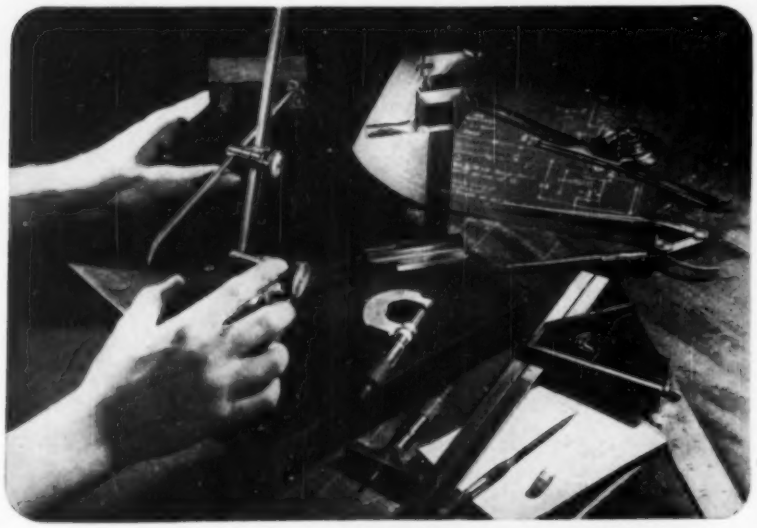

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NEWS NOTES

(Continued from previous page)

mentary material, an order blank is included with each catalogue.

Teachers can secure copies of the index, "Westinghouse Sound Motion Pictures and Slide Films for School Use," by writing to the School Service Department, Westinghouse Electric Corporation, 306 Fourth Avenue, Box 1017, Pittsburgh, 30, Pa.

♦ The fellowship programs to provide assistance to United States graduate students for study or research in the other American republics are administered jointly by the U. S. Office of Education and the Department of State. Qualified graduate students wishing to apply for fellowships under either of these programs should write to the Division of International Educational Relations, American Republics Section, U. S. Office of Education, Washington 25, D. C., for application forms. —*NEA Bulletin.*

♦ Complete data on the performance of 20 structural clay tile partitions subjected to fire-endurance and hose stream tests at the National Bureau of Standards are contained in a new booklet, *Fire Resistance of Structural Clay Tile Partitions*, now available from the U. S. Government Printing Office.

Building Materials and Structures Report BMS 113, *Fire Resistance of Structural Clay Tile Partitions* — 19 large 2-column pages, 18 figures — can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at a cost of 15 cents a copy.

♦ Forty-five instructors of Henry Ford Trade School, Dearborn, Mich., received certificates of professional attainment from the College of Education, Wayne University, in January, following a banquet in the University Student Center.

The 45 men, their instructors, representatives from the Michigan State Department of Education, the Detroit Board of Education, the administrative staff of Wayne University, and their wives were guests of Henry Ford Trade School at the banquet.

Certificates were awarded by Dr. W. E. Lessenger, dean of the College of Education of Wayne, and Supt. S. D. Mullikin, Henry Ford Trade School.

Earl L. Bedell, divisional director of vocational education, Detroit Public Schools, was toastmaster.

"Vocational Education in the Years Ahead" was discussed by Ralph C. Wenrich, assistant superintendent of public instruction in charge of vocational education in Michigan.

♦ Four trainees from three American Republics were officially launched on training programs in this country in February under the industrial-training program of the Bureau of Apprenticeship, U. S. Department of Labor.

One of the trainees will be trained in the plumbing trade, two in electrical work, and one trainee, who is a woman, will receive her training in a rayon plant.

The Bureau of Apprenticeship is conducting the program of training in private industry in this country for foreign nationals, as part of the international program of technical assistance under the over-all supervision of the Department of State.

When their training has been completed they will return to their respective countries and re-enter industry at a higher level of skill which may be utilized in training others.

♦ New York State School of Industrial and Labor Relations at Cornell University, Ithaca, N. Y., announces the establishment of a special summer seminar in personnel management as a result of requests from various representatives of business and industry. The seminar is under the direction of Professor Earl Brooks, secretary of the school and professor in charge of personnel management. Enrollment in the seminar will be limited to persons who are engaged in, or who are about to be assigned to personnel or industrial relations work. The program aims to help those persons who have had business experience but lack extensive experience in personnel management and industrial relations. The purpose of this seminar is to provide an opportunity to become acquainted with personnel principles, common personnel practices and problems, and literature in the field.

In addition to the personnel seminar, participants will choose a maximum of two other related courses among those offered by the School which includes: Human Relations in Industry, Audio-Visual Methods, Survey of Industrial and Labor Relations, Labor History, Public Relations, Economics of Wages and Employment, and Labor Relations Law and Legislation.

The summer session will start on July 5, 1949, and will continue through August 13. Interested companies are being invited to send one or more employees to this session.

♦ Texas A. & M. College, College Station, Tex., announces the appointment of guest professors for the graduate summer program which starts on June 7. Those who will assist the regular faculty are Dr. John R. Ludington, specialist in industrial arts for U. S. Office of Education in Washington, and John E. Cherry, supervisor of industrial-arts education in the Fort Worth, Tex., public schools.

♦ The Summer Refresher Course in Textiles and Testing Techniques will be offered for the eleventh year, July 11–29, by the United States Testing Company and under the supervision of James Giblin.

The course offers a unique opportunity to study all phases of testing for textiles and related merchandise by lectures, demonstrations, and laboratory practice work.

Textile testing, microscopy, chemistry, microbiology, leather, dye chemistry, detergency, research, and engineering will be represented in the three weeks' study. Field trips to a textile finishing mill and a manufacturer of synthetic fibers will be conducted for those interested.

(Continued on page 18A)

The Ideal Training Lathe

Equipped With
8-SPEED GEARED HEAD

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Medium-Priced . . . Simple Design . . . Extra-Sturdy Construction

LOW MAINTENANCE COST!

Students trained on the modern "King-made" Sebastian Lathe are *fully* trained — equipped to run any size engine lathe, large or small.

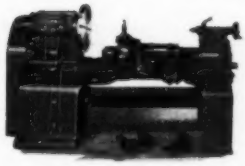
The medium-priced Sebastian, widely used throughout industry, has a great many outstanding construction and operating features. Among standard features are: 8-speed geared head . . . Timken Bearings on all headstock shafts . . . Reverse in apron for feeds . . . 57 feed and thread changes . . . Control handle on apron for longitudinal friction feed . . . Travel safety on compound . . . Apron control for start, stop, and reverse of spindle (standard on lathes with beds 10′ and longer; also available on other bed sizes).

An unusually large number of accessories are supplied as regular equipment, *included in the basic lathe price.*

Before deciding on any lathe it will pay you to thoroughly investigate the modern Sebastian. Ask your nearest Sebastian dealer or write us direct for Catalog S-1 (Standard Lathes) and S-101 (Special Lathes — Gap, Clutch & Brake, etc.)

Sebastian GEARED HEAD LATHES

MANUFACTURED BY KING BUILDERS OF WORLD-RENOWNED "KING" BORING & TURNING MACHINES



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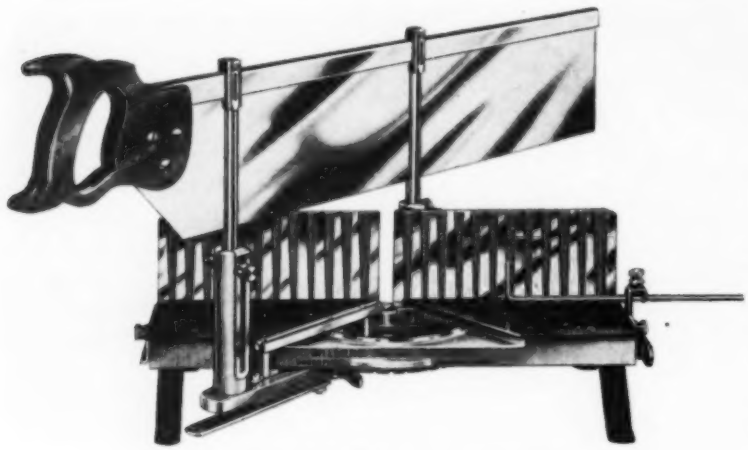

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The Langdon Acme Mitre Box — a Millers Falls product — has been outstanding in its field for years. Now there's a new, even better, Langdon Acme Mitre Box replete with many tested improvements making it, more than ever, the best value for school, shop or professional use.

The bed and back have been redesigned for additional sturdiness. The saw carriage, posts and saw guides are now made of steel. Each saw guide has three "Oilite" bearings providing smoother saw action. Many other tested refinements have also been incorporated to insure continuing accuracy, dependability and ease of operation.

Ask your supplier for full information about this new, improved Langdon Acme Mitre Box, or write direct.

MILLERS FALLS TOOLS
SINCE 1868

MILLERS FALLS COMPANY GREENFIELD, MASSACHUSETTS

NEWS NOTES

(Continued from page 16A)

Application forms and further information may be obtained from Consumer Service Division, United States Testing Company, Inc., 1415 Park Avenue, Hoboken, N. J.

♦ The University of Minnesota, Minneapolis, Minn., is offering scholarships for study in milling engineering.

The new scholarships are available to outstanding high school seniors and college students with ability in chemistry, physics, and mathematics and will range in amount from tuition and fees for three quarters to a maximum of $500 per academic year.

Selection of scholarship winners, Dr. Morrill explained, will be based on character, demonstrated leadership qualities, engineering promise, academic aptitude, and potential improvement of educational opportunity through financial aid. Applications are now being received for the 1949–50 school year and should be addressed to the dean of the institute of technology at the University.

Funds with which the scholarships were set up were contributed by firms in the flour milling and grain processing industry through the Greater University fund.

John M. MacKenzie, assistant professor of mechanical engineering, heads the program.

♦ A realistic program of educational administration is operating in the School of Education at Cornell University to give students "internships" as school superintendents and principals. Dr. J. E. Butterworth, professor of rural education at Cornell, and Dr. Lloyd Elliott, assistant professor of secondary education, have developed the program, which allows students to work directly with school administrators in Tompkins County.

Under the project, the school gives the student guidance one full day each week in working with the curriculum needs of pupils, relations with the public and the community, development of effective Parent-Teacher organization and other important phases of administration.

The program is supplemented by monthly meetings held under Dr. Butterworth's direction. The meetings are planned for students who hope to become educational administrators, and feature a speaker from the educational field in or around Ithaca.

♦ To educate juvenile offenders, the Federal Government has launched a driver's training program in an institution where fully 80 per cent of the inmates are being punished for car thefts.

The institution is the National Training School for Boys at Washington, D. C. The American Automobile Association's standard course has been installed with the co-operation of the Chevrolet Motor Division.

By this means, federal authorities believe that the boys will not only learn to drive an automobile properly, but that it will add to their confidence and self-respect, and that they will be less of a highway menace.

The course is concentrated in six weeks before the boy's release.

♦ The Department of Education of the American Type Founders Sales Corp., 200 Elmore Ave., Elizabeth B, N. J., has expanded its line of special equipment for educational use to include two new Tauber plastic binding units.

The ATF-Tauber-Tube Binding unit, No. 20, uses plastic tubes or multiring coils, and the ATF-Tauber-Twist unit, No. 22, uses Tauber-Twists, which are continuous plastic bindings that fit multiple-hole punchings.

Each of the units includes a Hercules hand punch, specifically designed for continuous production service, and for ease in setting up the special dies for these types of binding operations. The tube binding unit also has two Tauber slot-hole dies for punching holes to accommodate both the tube and multiring plastic bindings, and an assortment of white, blue, and red tubes and multirings in different popular sizes used most generally in schools and institutions.

Designed expressly for use with the Hercules punching machine, the slot-hole dies can be operated singly or in gangs, and can be set to punch holes as close as 1 in., or as far apart as the machine will allow. This flexibility adapts them to the binding requirement of any book, and the rounded ends of the slot-hole — exclusive features of Tauber-Tube die design — provide added binding strength.

The Tauber-Twist Binding unit has two Tauber-Twist, 4-in. dies, and a Tauber-Twist electric sealer, which puts the patented heat-sealed lock on the ends of the continuous twist binding. The dies are built in 4-in. sections, for use either singly or ganged into continuous punching lengths up to 20 in. Also supplied with this binding unit is an assortment of red, white, and blue Tauber-Twists in sizes appropriate for school use. Additional twists are available, on order, in light blue, royal blue, crystal, green, yellow, pink, and black.

♦ A four-year major course leading to a bachelor's degree in jewelry and silversmithing has been instituted in the fine arts department at the University of Kansas, Lawrence, Kans. The course, which was begun in the spring semester, is believed to be the first of its kind in the country leading to a college degree.

Subject areas covered by the new course include jewelry benchwork, enameling, soldering, raising holloware, forging flatware, engraving, and sand and centrifugal casting.

If many of us are to become missionaries of the American faith, we must understand not only ourselves but other people throughout the world. — *Benson Ford.*

New Publications

Carpentry Mathematics

By J. Douglas Wilson and Clell M. Rogers. Cloth, 249 pp., 5¾ by 8¼ in., illus., $2.20. McGraw-Hill Book Co., New York City.

This is the new second edition of this text on mathematics for carpenters. All of the material has been brought up to date. This edition continues the checkup procedure and the review setup for slow students contained in the former edition.

The book contains a wealth of problems, and the answers to these are given in the back of the book.

Architectural Drawing for the Building Trades

By Joseph E. Kenney and John P. McGrail. Cloth, 128 pp., 9¼ by 12¼ in., illus., $3. McGraw-Hill Book Co., New York City.

A text for beginners in architectural drawing in which the general elements of the use of drawing instruments, lettering, and the like, are first explained. This is followed by an explanation of pictorial and perspective drawing. Orthographic projection is then taken up after which molding, cabinetmaking, joints, symbols, and conventions, and wall indications, framing, and other building details are studied. Finally, the subject of the floor plan, and elevations are described.

The entire book comprises 35 lessons. A good glossary of architectural and building terms also has been added.

Television — How It Works

Paper cover, 203 pp., 8½ by 11 in., illus., $2.70. John F. Rider Publisher, Inc., 404 Fourth Ave., New York 16, N. Y.

A text on television which makes clear to the serviceman just how to build up his knowledge of this new step in human communication systems.

The material is clearly explained and well illustrated so that the reader can get a grasp of the principles of this subject.

The 12 chapters, into which the book is divided, describe the general aspects of television systems; frequency characteristics of the television signal; receiving antennas; R-F amplifier, oscillator, and mixer circuits; sound channels; the video I-F and detection section; video amplifiers and d.c. restorers; synchronizing circuits; sweep circuits; picture tube; power supplies; and alignment and servicing.

The Teacher's Technique

By Charles Elmer Holley. Cloth, 360 pp., 5½ by 8⅛ in., $3. The Garrard Press, Champaign, Ill.

A book containing explicit directions for improving teaching standards.

It starts out with a discussion of the teacher's problem, the subject matter, and the outcomes of teaching.

It then explains the teaching methods that are to be used, and shows how to teach the student to study effectively, and how he may apply his knowledge and skills. There also are chapters on developing desirable personality habits, and how to use the library and the laboratory. Testing and measurements also are discussed.

Basic Electrical Principles

By Maurice G. Suffern. Cloth, 430 pp., 5¾ by 8¼ in., illus., $3.20. McGraw-Hill Book Co., New York City.

A vocational text simply expounded for students who need a good background as a basis for future specific trade training.

The book presents the subject matter in 12 chapters which explain the electron theory, batteries, electric circuits, electromagnetism, inductance, capacitance, effects of inductance and capacitance, electric generators, motors, rectifiers, and meters.

The book also contains a list of visual materials which can be obtained for making the instruction as effective as possible.

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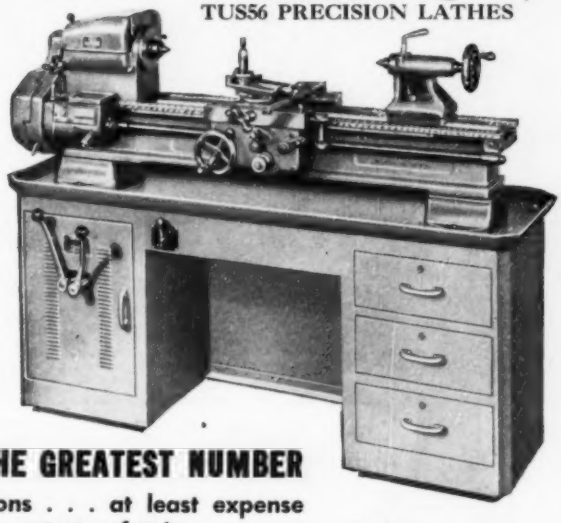

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of operations . . . at least expense
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● The Sheldon TUS56 Precision Lathe is not only the finest school lathe, it is also the most practical. Its large capacity, full size standard controls permit the teaching of all lathe operations at standard industrial speeds and feeds. Its "Zero Precision" (Timken finest) Taper Roller Spindle Bearings permit working to the very closest tool room tolerances and hold their extreme accuracy without servicing even under years of student operation. It's safer because all belts, motor and drive are completely enclosed — speed changes are made entirely with external levers.

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Practical Shop Mathematics — Vol. II Advanced

By John H. Wolfe and Everett R. Phelps. Cloth, 356 pp., 5 by 8 in., illus., $2.60. McGraw-Hill Book Co., New York City.

This is a new third edition of both volumes 1 and 2, which brings all of the material up to date. Volume I now contains a new chapter on the slide rule, and completely new problems on algebra, geometry, and quadratics.

Volume II presents work on compound angles and their application, and problems on gear ratios, gears, planetary gearing, plain and differential indexing, and combining fractions and continued fractions.

Encyclopedia of World Timbers

By F. H. Titmuss. Cloth, 156 pp., 5¾ by 8¾ in., $4.75. The Philosophical Library, Inc., New York, N. Y.

A book based on the results obtained from research studies made during World War I.

The book describes how trees grow, how they are divided into soft and hard woods, and the structure of each of these two divisions. The vagaries of nomenclature, and the practice of attaching the names of superior kinds of lumber to inferior kinds which have only a superficial resemblance also are discussed, as is the naming and identification of timbers.

The index gives the botanical and alternative trade names, and there is an extended bibliography.

Blueprint Plans

Published by American Builder, 105 W. Adams St., Chicago 3, Ill. Paper cover, spiral binding, 28 pp., 8½ by 11½ in., $2.50.

A set of 12 complete blueprints covering 21 homes and 7 garages. These plans were taken from the "American Builder Magazine."

(Continued on page 20A)

The Lowest Priced, Practical, Rapid Production
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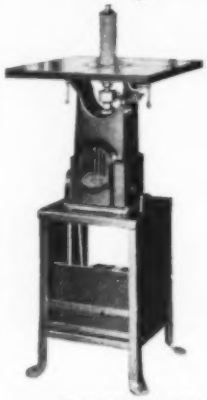

Not one important feature of high priced machines has been omitted. It sands woods and grinds plastics, aluminum, masonite, brass, bronze, zinc and sheet metal and does internal and external grinding on contours. Compact, portable and vibrationless.

Handles 1", 1½", 2" and 3" abrasive sleeves for a wide work range.

Sands or grinds up to six inch thick stock, straight and contours to as sharp a radius as ½" and all bevels 0 to 45°.

Table tilts by sensitive worm and rack fitted with accurate quick reading scale for beveling, drafting patterns and for core-box work.

Drum oscillates with a ⅞-inch stroke, 83 times per minute at 2,500 r.p.m.'s, sanding silky smooth with the coarse faster cutting longer-lived abrasives, a sure protection against scoring.

Convenient large storage compartment in the floor stand for all accessories and a large supply of abrasive sleeves.

Sealed crankcase keeps out dust and dirt. Rotating parts run in a bath of oil. Oscillating mechanism mounted on precision steel balls for friction-free, vibrationless operation.

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Ball bearings at all vital points. Positive lubrication.
Table: Tilts 45° two ways. 20" x 20".
Stroke: ⅞". 83 complete strokes per min. at 2500 r.p.m.
Drums: 9" long — 6" above table. Expanding rubber.
Abrasive Sleeves: 1", 1½", 2", 3" dia.

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- As nearly 100% safe as modern devices permit.
- Of just the right size for school shops, they permit more efficient layouts than larger equipment.
- Durably constructed, they can take a beating which would incapacitate most machines.

NEW PUBLICATIONS

(Continued from page 19A)

General Repair Tools for Automobile Mechanics

Hard bound, cloth cover, $3; plastic bound, paper cover, $2; 180 pp., 7¼ by 10¼ in., illus. Delmar Publishers, Inc., Albany, N. Y.

This is the first of a series of texts on related technical material for training automobile mechanics.

The text gives the beginner a fundamental knowledge of automobile construction, operation, and repair, and shows the beginner how to make use of the instructional manuals furnished by automobile manufacturers.

The tools described, include the measuring tools used, saws and files, chisels and punches, soldering tools and appliances, portable drills, taps and dies, stud removers, use of grinders and abrasives, and arbor presses.

Brake Work for Automobile Mechanics

By Truman G. Dell, Frank E. Howard, and George E. Stevenson. Hard bound, cloth cover, $3.50; plastic bound, paper cover, $2.75; 194 pp., 7¾ by 10¼ in., illus. Delmar Publishers, Inc., Albany, N. Y.

A text on automobile brake systems, and the tools and equipment needed to adjust, repair, and maintain them.

The "how-to-do" units in the book give an analysis of the brake job and explain how to disassemble and inspect the parts, and how to make the necessary repairs and replacements.

Mechanical Training

By William Boss, J. Grant Dent, and Hall B. White. Cloth, 273 pp., 6⅛ by 9 in., illus. Bruce Publishing Co., St. Paul and Minneapolis, Minn.

A second edition of this text for home and farm shops which gives the beginner a good understanding of how to equip a shop, sharpen tools, solder, work with cement, do ropework, install and maintain pulleys and belts, do electric wiring, work with leather, fit pipes, do cold metal work and also forge, do babbitting, repair and maintain autos and tractors, do woodworking, painting, and glazing.

Aircraft Maintenance and Repair

Edited by Charles Edward Chapel. Cloth, 444 pp., 8½ by 11⅛ in., illus., $6. McGraw-Hill Book Co., New York City.

A well-illustrated text which explains clearly to the beginner how to inspect, overhaul, repair, and maintain all parts of an airplane.

It starts out with a discussion of the fundamentals of aircraft hydraulics, explains the hydraulic system, and the landing gear. The further chapters of the book describe heat-treating of metals, welding, layout work, riveting, construction and repair of wood aircraft, fabric covering, how to apply dope, and how to assemble, rig, weight, balance, and load an airplane.

Introductory Radio — Theory and Servicing

By H. J. Hicks. Cloth, 393 pp., 6¼ by 9¼ in., illus., $3.20. McGraw-Hill Book Co. Inc., New York City.

A text for high school classes in radio. The book starts in with the elements of magnetism and electricity so that previous knowledge of the subject of electricity is not necessarily required. Then the discussion takes up the fundamentals of radio construction and repair, radio tubes, audio amplifiers, power supplies, radio receivers, test equipment, loud-speakers, accessories, public-address systems, antennas, and television.

The book contains diagrams of many circuits, a goodly number of problems for the student to work out, and lists of suggested topics for discussion. It also contains much helpful information and useful tables of necessary facts.

Aircraft, Electrical Systems, Hydraulic Systems, and Instruments

By Col. R. H. Drake. Cloth, 393 pp., 6¼ by 9⅛ in., illus., $5.60. The Macmillan Co., New York City.

A simple explanation of these three closely related parts of a modern airplane. Both theory and practice are covered.

The book should be a valuable text for those who want to qualify for the C.A.A. aircraft and engine mechanic certificate, and for special ratings in any one of the three fields.

Labor and Social Organization

By David Aloysius McCabe and Richard Allen Lester. Cloth, 373 pp., 5¼ by 7½ in., $2.75. D. C. Heath and Co., Boston, Mass.

This is the final volume of a six-book series on economics. It is really a text on labor problems which analyzes the economic factors and forces which are so disturbing in this industrial age.

It consists of four parts in which are presented the history of the rise, growth, and structural pattern of labor organizations; the legal status of collective labor activities, governmental intervention and regulation. The problems of social security compensation for accident and unemployment, old age, and other social security issues also are discussed.

Probably some readers will not agree to all of the deductions made by the authors, but the book will give the reader a good picture of present-day conditions in the field of labor.

Starting and Managing a Farm

By C. M. Hampson. Cloth, 250 pp., 5⅝ by 8⅛ in., illus., $2.60. McGraw-Hill Book Co., New York City.

A textbook which deals with the farm question from the time the land is bought until it is producing income.

It is based on 35,000 records from 31 states and hence covers the problem of the common types of farming in all parts of the United States.

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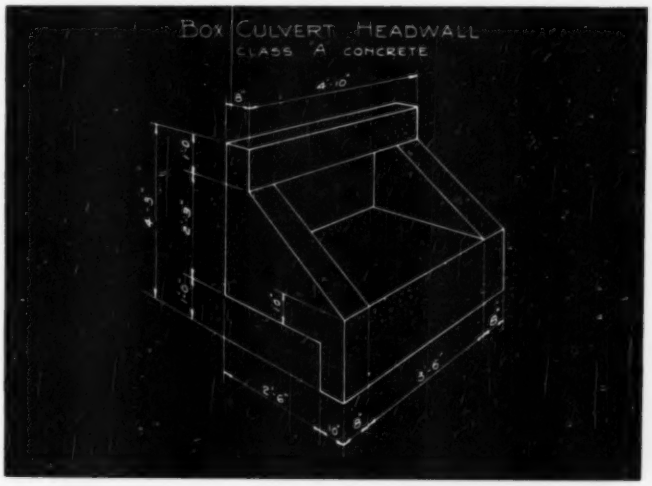

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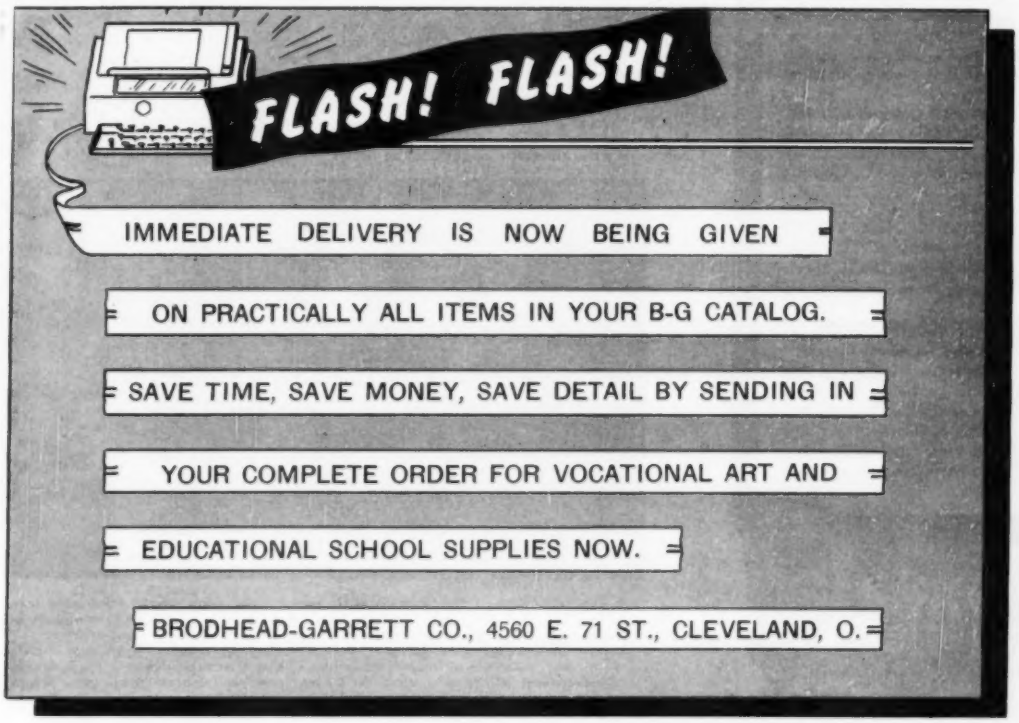
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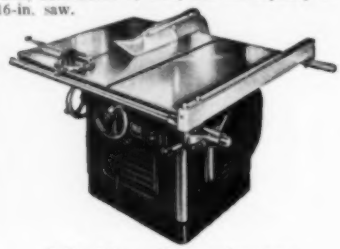
Shop Equipment News
NEW PRODUCTS — PUBLICATIONS

DELTA 12-IN. TILTING ARBOR SAW

The new 12-in. tilting-arbor saw recently marketed by Delta Manufacturing Division, Rockwell Manufacturing Company, 660-E E. Vienna Ave., Milwaukee 1, Wis., has the capacity of a 16-in. saw.



Delta 12-in. tilting arbor saw

It will cut stock 4⅛ in. thick and at a 45-deg. tilt stock 2⅞ in. thick. Its table is 38 by 48 in., which supports large work readily.

The saw is equipped with a "Super-Safe" blade guard that pivots with the work so that the blade remains covered while the view is unimpaired.

The 1⅛-in. arbor runs on lubricated-for-life ball bearings.

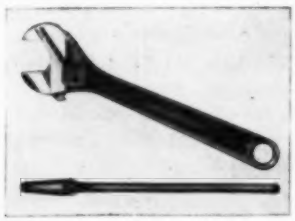
The machine is equipped with a scale magnifier lens which makes it easy to set the rip fence accurately. The rip fence is set with a micro-set pinion, and clamps front and rear simultaneously.

The saw also is furnished with a longer optional extension for molding cutter and dado head.

For brief reference use IAVE—0601.

NEW WILLIAMS ADJUSTABLE WRENCHES

J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y., announces a new line of carbon steel adjustable wrenches which are thinner and lighter than conventional adjustable wrenches of similar capacity. They have thin, tapered jaws and possess unusual strength and toughness due to an exclusive improvement in design and materials. Made in 4, 6, 8, 10, 12, 15 and 18-in. sizes with maximum capacities from ½ to 2⅛ in., they are drop-forged from specially selected steel and accurately heat-treated for uniform, dependable strength.



Williams adjustable wrench

They have the Williams patented sliding jaw feature which provides maximum and positive bearing against working stress. Wedging and spreading action is entirely eliminated.

This less costly line of adjustable wrenches is fully described in Williams A-40 Booklet which includes a complete line of other types of carbon steel wrenches made by this manufacturer.

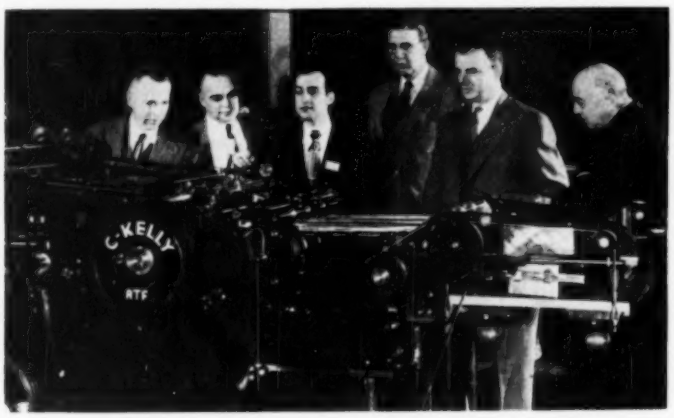
For brief reference use IAVE—0602.

A.T.F. PLANT TOURS

Top officials of the Elizabeth, N. J., school system, led by Superintendent J. Harry Adams, recently took part in a unique industrial plant tour, one of a series being conducted at the American Type Founders works in Elizabeth, N. J.

These see-for-yourself visits arranged at American Type Founders are for small groups — from

(Continued on next page)



Ten top officials of the Elizabeth, N. J., school system were recently taken on a tour, unique in industry, of the American Type Founders plant at Elizabeth, as guests of Thomas Ray Jones, head of the company

Left to right: J. Francis Gallagher, principal, Alexander Hamilton Junior High School; F. W. Laso, supervisor of business education; William Massarsky of ATF; J. Harry Adams, superintendent of schools; John E. Dwyer, principal, George Washington School; Merrill P. Paine, director of English and chairman of curriculum

SHOP EQUIPMENT NEWS

(Continued from previous page)

10 or 12 up to 30 or 35 — to provide thorough orientation before the actual walk-through begins, and affording the opportunity to get all questions answered.

Initial tours have proved so successful that the plan will be extended to the American Type Founders printing press factories in Brooklyn and Mount Vernon, N. Y., and the plants of the other companies owned by ATF Incorporated. These include the Daystrom Corporation, Olean and Friendship, N. Y., and the Balboa-Pacific Corporation, Fullerton, Calif., manufacturers of tubular chromed steel furniture; Daystrom Laminates, Inc., Daystrom, N. C., hard plywood and lumber producer; and, Frederick Hart & Company, Poughkeepsie, N. Y., electronics equipment manufacturer.

Leaders in each locality — school superintendents, principals, and teachers; the clergy, public officials, members of women's business and professional organizations — as well as employees' families, students, company stockholders, customers and special groups, are scheduled to be invited.

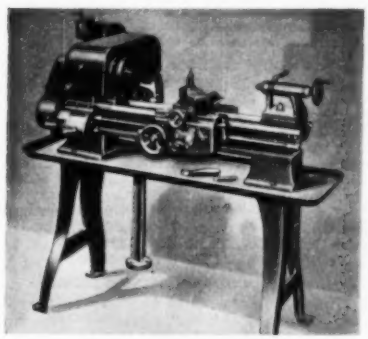
The object of these plant visits is to tell the economic story of industry, and to drive home the idea of the interdependence of each group in American society.

For brief reference use IAVE—0603.

NEW 11-IN. SWING LOGAN LATHE

The new Logan 11-in. lathe boasts of increased capacity and improved construction.

With 1-in. collet capacity for draw-in collets and center distances of 24 and 36 in., the new lathes have definitely greater capacity than previous Logan models. The over-all construction also



New Logan 11-in. lathe

is considerably heavier. The heavier headstock, for example, is now built with the Logan preloaded ball-bearing spindle mounting which assures sustained accuracy at all spindle speeds from 45 to 1500 r.p.m., without bearing adjustment. Total spindle runout is held to within .0005 in., 12 inches from the bearing. The two V ways and the two flat ways of the heavier, more rugged bed are precision ground to a tolerance of .0005 in. along the lineal capacity of the lathe.

Full quick change gear equipment provides instant selection of 48 threads and feeds.

The new 11-in. models are available in cabinet and bench types as well as the conventional floor types.

Full details and a new, illustrated folder may be obtained by addressing Logan Engineering Co., 4901 West Lawrence Ave., Chicago 30, Ill.

For brief reference use IAVE—0604.

(Continued on next page)

KESTER the Greatest Name in Solder!

THERE is a reason for Kester's tremendous success in the industrial field. A staff of highly-trained technical engineers and a half-century of Kester "know how" are teamed to produce the finest flux-core solders made.

Use Kester Flux-Core Solders in the classroom and acquaint your students now with the solder they will use when they enter into industrial fields.

WRITE FOR THE NEW, FREE MANUAL—"SOLDER AND SOLDERING TECHNIQUE"

A complete analysis of the application and properties of soft solder alloys and soldering fluxes.

1899 50th Anniversary 1949

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Supply your woodworking students with Paxton lumber and plywood and assure them first quality materials. Their projects will acquire added beauty and durability when made of Paxton products. As a result, the student will derive greater satisfaction from his efforts to create an attractive article out of wood.

Paxton lumber and plywood meet every requirement and have always represented first quality — an important consideration in modern school shops where materials of doubtful quality have never proven an economy.

We are prepared to supply you at all times with lumber and plywood of the highest quality obtainable, measured and graded in the best interpretation of current national grading rules. Our reputation guarantees you the finest in these materials.

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SHOP EQUIPMENT NEWS

(Continued from previous page)

A NEW POWER HANDSAW

The Whiz-Saw is a compact portable power cutting tool manufactured by the Forsberg Manufacturing Company, Bridgeport, Conn.

It is amazingly powerful, yet light enough to make it a safe and easy tool to operate.

The new Whiz-Saw

A universal fractional h.p. motor delivers 3250 cutting strokes per minute and cuts through material up to 1 in. thick. A patented blade permits cutting directly through material without drilling a starting hole. The blade also is designed to cross cut or rip, and cuts intricate curves allowing ¼-in. radius turns. Blades are interchangeable.

The Whiz-Saw makes a quick, clean cut through all types of wood, even tough oak and maples; it also can be used to cut plastic sheets, hard rubber, fiber, asbestos, board, bone, masonite, etc.

The Whiz-Saw is an invaluable tool for carpenters, patternmakers, modelmakers, hobbyists, and many other craftsmen.

For brief reference use IAVE—0605.

NEW SOUTH BEND DRILL PRESS CATALOG

Both the bench and floor models of the new South Bend 14-in. precision drill presses are shown in this 7 by 10-in. catalog. Also illustrated and described are motors, controls, extra spindles, and other drill press accessories. Complete specifications and prices are listed. Diagrams are used to show all important dimensions of the drill presses.

A copy of catalog No. 400 may be obtained by writing to the South Bend Lathe Works, 178 East Madison St., South Bend 22, Ind.

For brief reference use IAVE—0606.

BOOK ON MODERN ARCHERY TACKLE

The Casein Company of America, 350 Madison Ave., New York 17, N. Y., has published a 34-

(Continued on page 26A)

CLAMPS

"Jorgensen" TRADE MARK REG U S PAT OFF

Genuine "JORGENSEN" Handscrews are the ones which will withstand "school shop service." To avoid future disappointment, be sure you ask for and get the genuine "JORGENSEN" every time.

They cost no more than any others.

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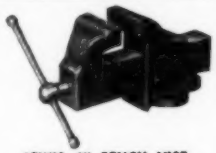
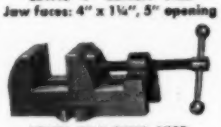
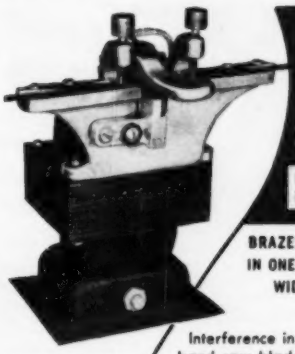


LEWIS 4" BENCH VISE
Jaw faces: 4" x 1¼", 5" opening



LEWIS 2¾" DRILL VISE
Jaw faces: 2¾" x 1⅜", 3¾" opening



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BRAZES BLADES UP TO ⅝" WIDE IN ONE OPERATION AND UP TO 1" WIDE IN TWO OPERATIONS

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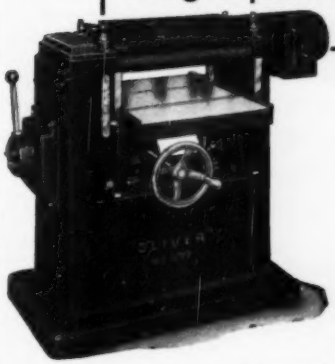
18-INCH
Single Surface Planer



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Has one-piece base assuring permanent alignment of parts . . . Heavy roller bearing safety-type cylinder has three high-speed knives . . . Heavy table runs on frictionless roller bearings . . . Power driven feed rolls handle 15 to 35 feet a minute . . . Takes stock up to 18 inches wide, 6 inches thick, short at 8½ inches when fed singly . . . Precision-built to give top service for years . . . Turns out exceptionally smooth, accurate work . . . *Write for Bulletin No. 399.*

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- SANDERS, all types
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- WALKER TURNER — ATLAS DEALERS

Write now for complete information on any items in which you are interested.

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SHOP EQUIPMENT NEWS

(Continued from page 24A)

page booklet on Modern Archery Tackle. It was written by Tracy L. Stalker, question and answer editor of the *Archery Magazine*.

The booklet is divided into three sections, treating of bows, bowstrings, and arrows respectively. The directions are brief but to the point, and the illustrations assist in making the whole a helpful little brochure for the archer who wants to make his own archery equipment. The book also contains a short glossary.

For brief reference use IAVE—0607.

NEW WALKER-TURNER SPINDLE SHAPER

A new two-speed vertical spindle shaper has just been placed in production by the Walker-Turner Division, Kearney & Trecker Corporation, Plainfield, N. J.

Two-speed vertical spindle shaper

This shaper has two speeds, 7000 and 11,000 r.p.m.; a 22 by 33-in. table; 3-in. vertical spindle travel (bearing assembly and motor move as a unit); a hand wheel and a graduated dial control the elevating mechanism; independently adjustable guides which are controlled by hand wheels; complete guarding for accelerated work speed; and a new Walker-Turner 1-h.p. single-phase or 1½-h.p. three-phase motor with big overload capacity.

These shapers are available for immediate delivery.

For brief reference use IAVE—0608.

PLASTIC-HANDLE HANDSAW

E. C. Atkins and Co., 402 S. Illinois St., Indianapolis, Ind., has introduced a plastic-handle handsaw.

Designated as the No. 3000, this saw features a nonsplitting, brown plastic handle with a non-slip molded grip.

The polished, straight back, taper ground blade of the No. 3000 is securely fastened to the plastic handle by three nickeled saw screws.

The No. 3000 is 26 in. long and is available in 7, 8, 10, or 11-point cutoff teeth; 5½-point rip teeth.

Each No. 3000 plastic-handle handsaw is packed in an individual moisture-proof bag.

For brief reference use IAVE—0609.

BUILD A BACKSTAND AS A CLASS PROJECT

Behr-Manning Corporation, a Division of the Norton Co., Troy, N. Y., offers shop instructors a set of 19 drawings, photographs, and explosion views for building a backstand, a useful shop tool for grinding and polishing. This tool may be built in their own school machine shops, and the blueprints will cost only fifty cents.

For further information write to the address given in the foregoing.

For brief reference use IAVE—0610.

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Start a project for pleasure or profit. Make ship, plane and train models, delicate, internally carved costume jewelry, wooden statuettes, bookends, etc. Handee is the ideal tool for hobbyist, repairman, mechanic — novice or expert. It gives you smooth, steady power right at your fingertips, responds easily to your direction. Handee works on wood, plastic, metal, alloy, glass, leather, horn, stone, bone, linoleum. AC or DC. Wt. 12 oz. 25,000 r.p.m.

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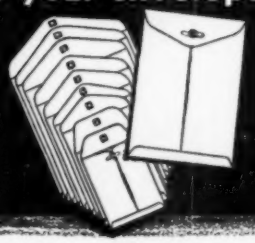

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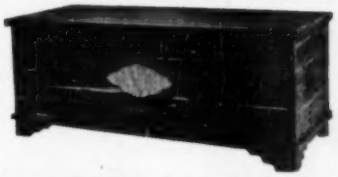

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62	American Gas Furnace	28A
63	American Steel Foundries, King Tool Div.	17A
64	American Technical Society	26A
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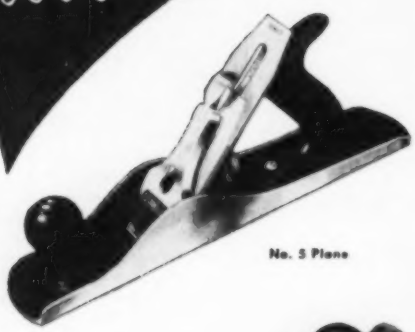

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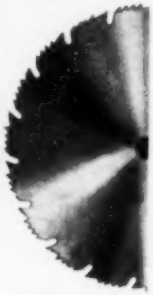

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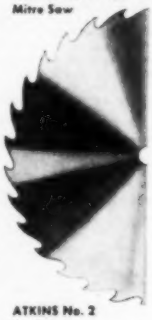

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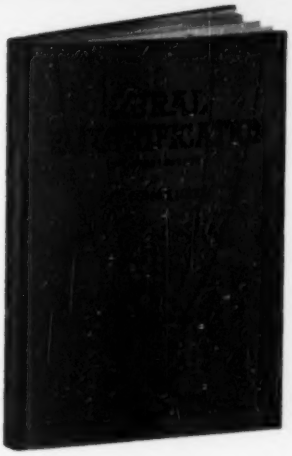

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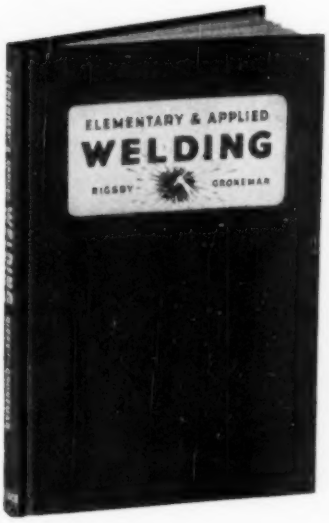

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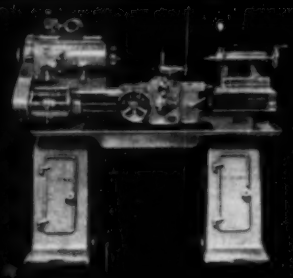

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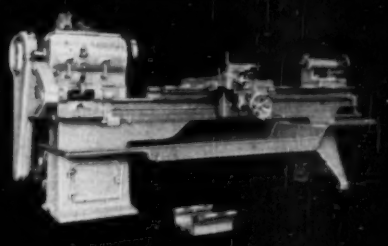

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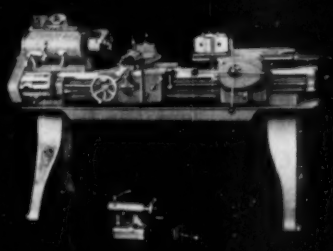

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